SOIL SURVEY OF

Jennings County, Indiana

United States Department of Agriculture
Soil Conservation Service
In cooperation with
Purdue University
Agricultural Experiment Station

HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY contains information that can be applied in managing farms and woodlands; in selecting sites for roads, ponds, buildings, and other structures; and in judging the suitability of tracts of land for farming, industry, and recreation.

Locating Soils

All the soils of Jennings County are shown on the detailed map at the back of this publication. This map consists of many sheets made from aerial photographs. Each sheet is numbered to correspond with a number on the Index to Map Sheets.

On each sheet of the detailed map, soil areas are outlined and are identified by symbols. All areas marked with the same symbol are the same kind of soil. The soil symbol is inside the area if there is enough room; otherwise, it is outside and a pointer shows where the symbol belongs.

Finding and Using Information

The "Guide to Mapping Units" can be used to find information. This guide lists all the soils of the county in alphabetic order by map symbol and gives the capability classification of each. It also shows the page where each soil is described and the page for the capability unit. It also gives the tree and shrub group and woodland suitability group in which the soil has been placed.

Individual colored maps showing the relative suitability or degree of limitation of soils for many specific purposes can be developed by using the soil map and the information in the text. Translucent material can be used as an overlay over the soil map and colored to show soils that have the same limitation or suitability. For example, soils that have a slight limitation for a given use can be colored green, those with a moderate limitation can be colored yellow, and those with a severe limitation can be colored red.

Farmers and those who work with farmers can learn about use and management of the soils from the soil descriptions and from the discussions of the capability units and the woodland suitability groups.

Foresters and others can refer to the section "Woodland," where the soils of the county are grouped according to their suitability for trees.

Game managers, sportsmen, and others can find information about soils and wildlife in the section "Wildlife."

Community planners and others can read about soil properties that affect the choice of sites for dwellings, commercial and industrial buildings, and institutional developments in the section "Town and Country Planning" and for recreational developments in the section "Recreation."

Engineers and builders can find, under "Engineering Uses of the Soils," tables that contain test data, estimates of soil properties, and information about soil features that affect engineering practices.

Scientists and others can read about how the soils formed and how they are classified in the section "Formation, Morphology, and Classification of the Soils."

Newcomers in Jennings County may be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the section "Additional Information About the County."

Cover: A pasture of tall fescue and Ladino clover on Avonburg silt loam, 0 to 2 percent slopes.

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Issued ---------------------- March 1976

This is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and agencies of the States, usually the Agricultural Experiment Stations. In some surveys, other Federal and local agencies also contribute. The Soil Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in the period 1967-71. Soil names and descriptions were approved in 1972. Unless otherwise indicated, statements in the publication refer to conditions in the county in 1972. This survey was made cooperatively by the Soil Conservation Service and the Purdue University Agricultural Experiment Station. It is part of the technical assistance furnished to the Jennings County Soil and Water Conservation District. Partial funding of this survey was provided by the Jennings County Area Planning Commission and approved by the county commissioners and county council.

SOIL SURVEY OF JENNINGS COUNTY, INDIANA

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UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, IN COOPERATION WITH THE PURDUE UNIVERSITY AGRICULTURAL EXPERIMENT STATION

JENNINGS COUNTY is in the southeastern part of Indiana (fig. 1) and has an area of 377 square miles, or 241,280 acres. Vernon, the county seat, and North Vernon, the largest town, are near the center of the county and are on the Vernon Fork of the Muscatatuck River. The population of Jennings County was 19,454 in 1970.

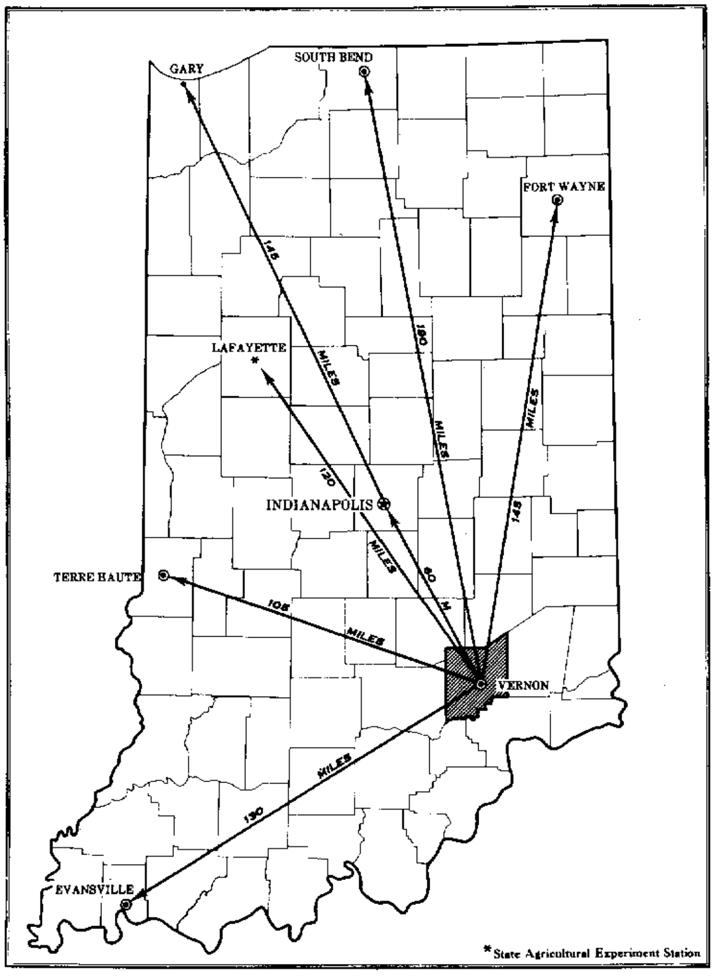

Figure 1. — **Location of Jennings County in Indiana.**

The extreme northwestern part of the county is characterized by nearly level to strongly sloping soils on uplands. These soils are on the Wisconsin till plain. The more strongly sloping soils are along streams that have entrenched into the till. The rest of the county is characterized by broad nearly level areas and gently sloping soils of uplands. These soils are on the Illinoian till plain, which is older than the Wisconsin till plain.

Streams have dissected and entrenched into the Illinoian till and have exposed the underlying limestone or shale bedrock in places. Along the major streams, especially in the southwestern part of the county, are nearly level flood plains. Most of these areas flood annually, and some flood more than once a year.

About 40 percent of the acreage in the county is used for crops. The nearly level areas and some of the gently sloping areas are used mainly for feeding swine or beef or growing grain. The gently sloping to strongly sloping areas are used mainly for grass and general farming. Most of the steep to very steep areas are used for woodland.

A part of this survey discusses nonfarm uses of soils. Areas around towns and along the highways are used more for nonfarm purposes currently than in previous years. Some of the soils in these areas have only slight limitations for nonfarm development, but other soils have severe limitations for nonfarm uses and their use is questionable. Nonfarm uses, such as recreational development and hunting, are not confined to the areas around towns and along highways.

The climate of the county is mid-continental and is favorable for farming.

The Jefferson Proving Ground occupies part of Jennings County. It is a large federal installation covering parts of three counties and is not included in this survey.

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soils are in Jennings County, where they are located, and how they can be used. The soil scientists went into the county knowing they were likely to find many soils they had already seen and perhaps some they had

not *(10)*.[1] They observed the steepness, length, and shape of slopes; the size and speed of streams; the kinds of native plants or crops; the kinds of rock; and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material that has not been changed much by leaching or by the action of plant roots.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures. The *soil series* and the *soil phase* are the categories of soil classification most used in a local survey.

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Cincinnati and Jennings, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in those characteristics that affect their behavior in the undisturbed landscape.

Soils of one series can differ in texture of the surface soil and in slope, stoniness, or some other characteristic that affects use of the soils by man. On the basis of such differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Cincinnati silt loam, 2 to 6 percent slopes, eroded, is one phase within the Cincinnati series.

After a guide for classifying and naming the soils had been worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, trees, and other details that help in drawing boundaries accurately. The soil map at the back of this publication was prepared from aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning the management of farms and fields, a mapping unit is nearly equivalent to a soil phase. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some other kind that have been seen within an area that is dominantly of a recognized soil phase.

Some mapping units are made up of soils of different series, or of different phases within one series. One such kind of mapping unit shown on the soil map of Jennings County is the soil complex.

A soil complex consists of areas of two or more soils, so intricately mixed or so small in size that they cannot be shown separately on the soil map. Each area of a complex contains some of each of the two or more dominant soils, and the pattern and relative proportions are about the same in all areas. Generally, the name of a soil complex consists of the names of the dominant soils, joined by a hyphen. Cincinnati-Rossmoyne silt loams, 4 to 10 percent slopes, eroded, is an example.

In most areas surveyed there are places where the soil material is so disturbed, so shallow, or so severely eroded that it cannot be classified by soil series. These places are shown on the soil map and are described in the survey, but they are called land types and given descriptive names. Gullied land is a land type in Jennings County.

While a soil survey is in progress, samples of soils are taken, as needed, for laboratory measurements and for engineering tests. Laboratory data from the same kinds of soils in other places are assembled. Data on yields of crops under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soils. Yields under defined management are estimated for all the soils.

Soil scientists observe how soils behave when used as a growing place for native and cultivated plants, and as material for structures, foundations for structures, or covering for structures. They relate this behavior to properties of the soils. For example, they observe that filter fields for onsite disposal of sewage fail on a given kind of soil, and they relate this to the slow permeability of the soil or to a high water table. They see that streets, road pavements, and foundations for houses are cracked on a named kind of soil, and they relate this failure to the high shrink-swell potential of the soil material. Thus, they use observation and knowledge of soil properties, together with available research data, to predict limitations or suitability of soils for present and potential uses.

After data have been collected and tested for the key, or benchmark, soils in a survey area, the soil scientists set up trial groups of soils. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others. They then adjust the groups according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect up-to-date-knowledge of the soils and their behavior under current methods of use and management.

General Soil Map

The general soil map at the back of this survey shows, in color, the soil associations in Jennings County. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in one association may be in another, but in a different pattern.

A map showing soil associations is useful to people who want a general idea of the soils in a county, who want to compare different parts of a county, or who want to know the location of large tracts that are suitable for a certain kind of land use. Such a map is a useful general guide in managing a watershed, wooded tract, or wildlife area, or in planning engineering works, recreational facilities, and community develop-

[1]Italic numbers in parentheses refer to Literature Cited, p. 89.

ments. It is not a suitable map for planning the management of a farm or field, or for selecting the exact location of a road, building, or similar structure, because the soils in any one association ordinarily differ in slope, depth, stoniness, drainage, and other characteristics that affect their management.

The names of some soil associations are unlike those appearing in recently published surveys of adjacent counties. This is because of the change in concepts of soil series in the application of the soil classification system and to the proportion of the major soils in the various soil associations.

The six soil associations in Jennings County are discussed in the following pages.

1. Haymond-Wakeland-Wilbur association

Deep, well drained to somewhat poorly drained, nearly level soils formed in recent loamy alluvium; on bottom lands

This association consists mainly of nearly level soils on flood plains along the larger streams and their tributaries throughout most of the county. It occupies approximately 11 percent of the county. About 21 percent of the association is Haymond soils, 17 percent is Wakeland soils, 13 percent is Wilbur soils, and the remaining 49 percent is minor soils (fig. 2).

Haymond soils are well drained. They are in long, narrow areas adjacent to stream channels. Along some of the smaller streams, these soils occupy the entire flood plain. They have a surface layer of dark grayish-brown silt loam. They are medium acid to neutral, depending on the amount of lime applied.

Wakeland soils are somewhat poorly drained. They are in long, narrow areas on bottom lands. They have a surface layer of dark grayish-brown to brown silt loam. These soils are medium acid to neutral, depending on the amount of lime applied.

Wilbur soils are moderately well drained. They are in long, narrow areas on bottom lands. They have a surface layer of dark grayish-brown to brown silt loam. These soils are medium acid to neutral, depending on the amount of lime applied.

The minor soils in this association are mainly Stendal, Steff, and Bonnie soils in small areas on bottom lands and Bartle, Pekin, and Elkinsville soils in small areas on terraces.

The soils in this association are used mainly for cultivated crops. Corn and soybeans are the main crops on

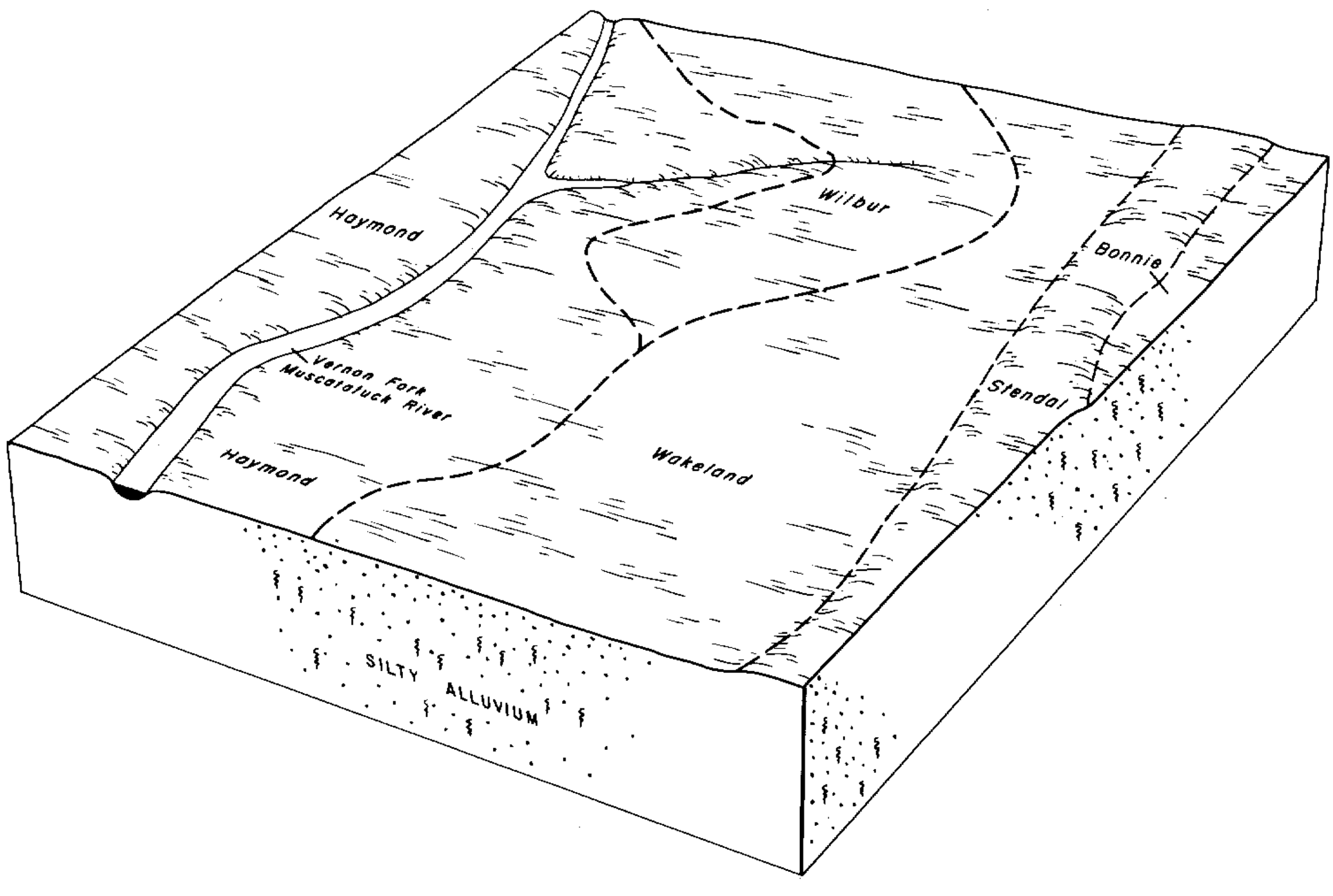

***Figure 2.* — Parent material and position of soils in association 1.**

these soils, but small grains and hay are also grown. Some small areas of this association are used for pasture, and some of the more poorly drained areas have never been cleared.

The major hazard in use and management of these soils is flooding. Overflow during the growing season occasionally destroys a crop. The flooding hazard can be reduced by the installation of floodwater control structures. Excessive wetness is a limitation on Wakeland soils, but the use of artificial drainage practices reduces this limitation.

2. *Cincinnati-Rossmoyne-Grayford association*

Deep, well drained, and moderately well drained, nearly level to moderately steep soils formed dominantly in loess and underlying loamy glacial till; on uplands

This association consists mainly of nearly level to moderately steep soils on ridgetops, breaks, and hillsides. It occupies approximately 41 percent of the county. About 50 percent of the association is Cincinnati soils, 25 percent is Rossmoyne soils, 10 percent is Grayford soils, and 15 percent is less extensive soils (fig. 3).

Cincinnati soils are well drained. They are gently sloping to moderately sloping on narrow ridges and short breaks, and they are moderately sloping and strongly sloping on broad hillsides. They have a surface layer of dark grayish-brown to brown silt loam. A very slowly permeable fragipan is at a depth of 20 to 30 inches. These soils are very strongly acid to neutral, depending on the amount of lime applied.

Rossmoyne soils are moderately well drained. They are nearly level and gently sloping on narrow ridges and are gently sloping on narrow short breaks. They have a surface layer of dark grayish-brown to light yellowish-brown silt loam. There is a very slowly permeable fragipan at a depth of 20 to 30 inches. These soils are strongly acid to neutral, depending on the amount of lime applied. In some places they occur in intricate patterns on the landscape with Cincinnati soils.

Grayford soils are well drained. They are gently sloping to moderately sloping on ridges and are moderately sloping to moderately steep on hillsides. These soils formed in loess, underlying glacial till, and residuum weathered from underlying limestone bedrock. They have a surface layer of dark-brown to yellowish-

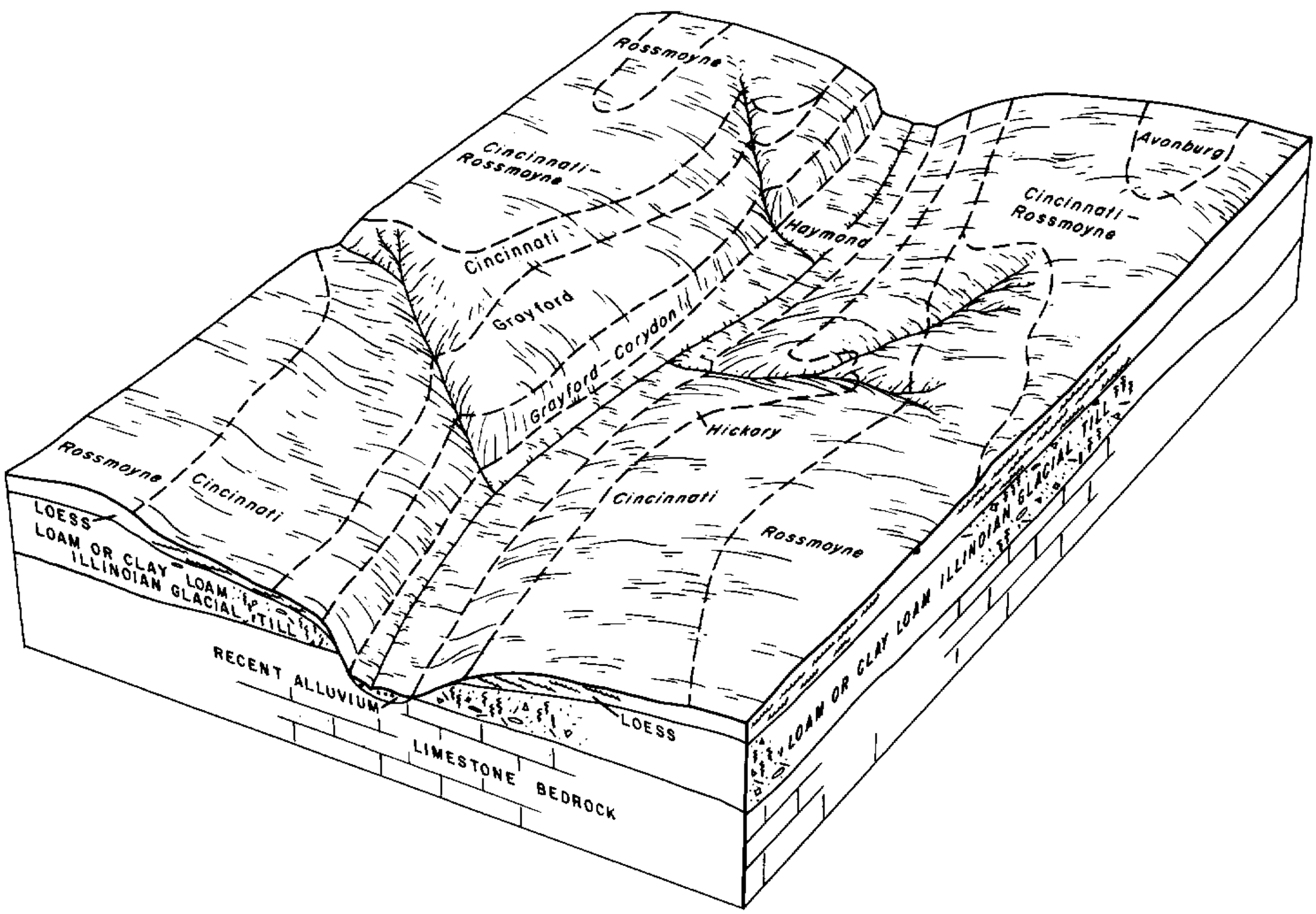

Figure 3. **— Parent material and position of soils in association 2.**

brown silt loam. Grayford soils are strongly acid to neutral, depending on the amount of lime applied.

Among the less extensive soils are the Jennings and Trappist soils on ridges, breaks, and hillsides of the uplands; Corydon, Hickory, and Weikert soils on hillsides of the uplands adjacent to drainageways; Haymond soils on bottom lands; and Avonburg soils on uplands.

Most areas of the soils in this association are used for small grain, hay, and pasture or are wooded. Some areas are used for corn and soybeans. Although natural fertility is low, these soils respond well to lime and fertilizer. They are improved by additions of plant residue.

Erosion and runoff are the main hazards in use and management of these soils. A very slowly permeable fragipan, which restricts the downward movement of roots and water, is the main limitation to use of the Cincinnati and Rossmoyne soils. In areas where the Grayford soils have sinkholes, mechanical practices ordinarily used to control erosion are impractical. Vegetative or cultural methods are necessary to control erosion in these areas. Farm ponds are hard to establish in the Grayford soils because water seeps into crevices of the underlying limestone bedrock.

3. *Clermont-Avonburg association*

Deep, poorly drained and somewhat poorly drained, nearly level and gently sloping soils formed in loess and underlying loamy glacial till; on uplands

This soil association consists mainly of nearly level and gently sloping soils on broad ridges throughout most of the county. It occupies approximately 41 percent of the county. About 28 percent of this association is Clermont soils, 25 percent is Avonburg soils, and the remaining 47 percent is minor soils (fig. 4).

Clermont soils are poorly drained. They are on high, broad ridges on uplands. They have a surface layer of grayish-brown to gray silt loam. Very slowly permeable, very firm and brittle layers begin at a depth of 30 to 48 inches. These soils are strongly acid to neutral, depending on the amount of lime applied.

Avonburg soils are somewhat poorly drained. They

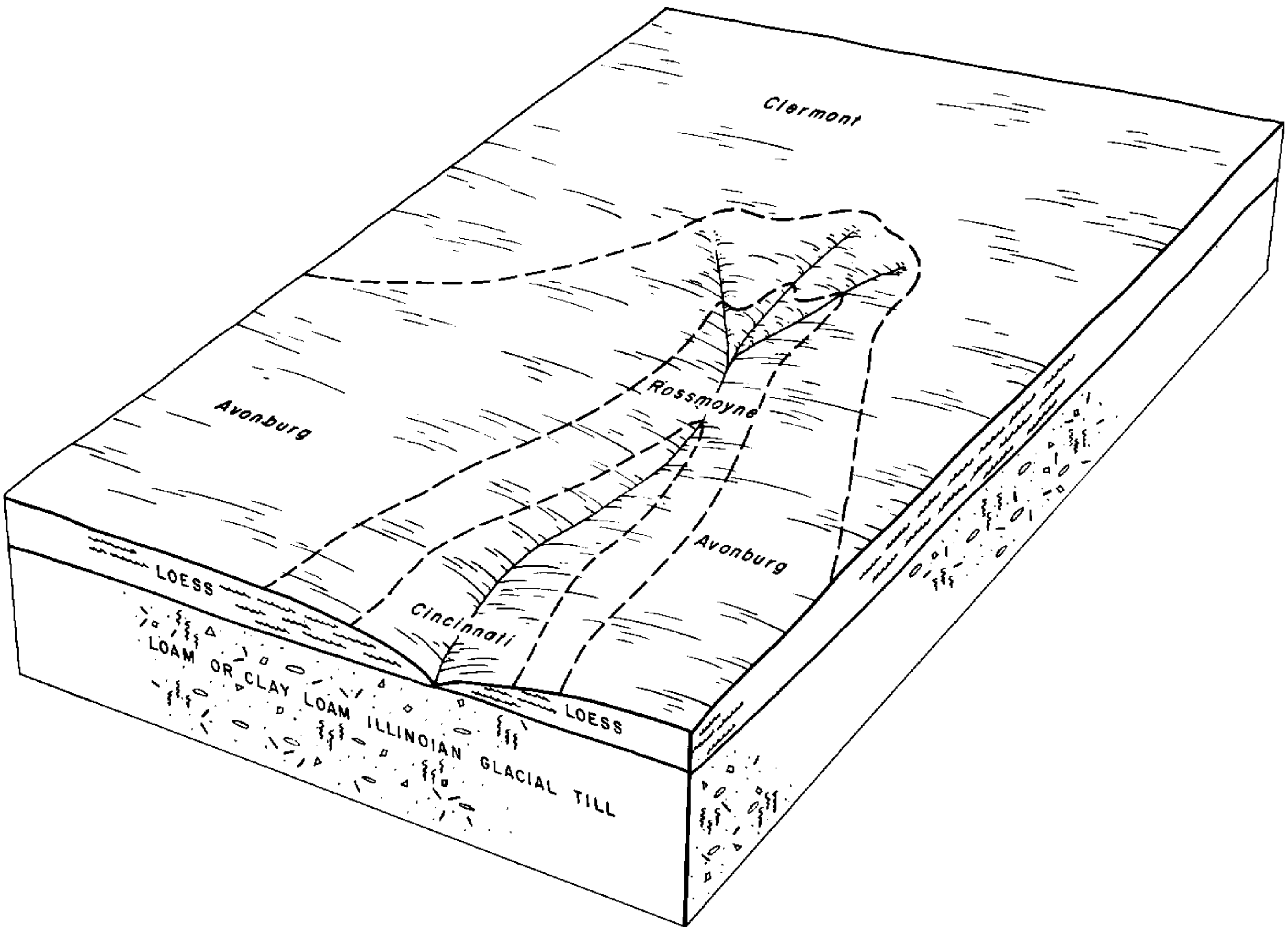

Figure 4. — Parent material and position of soils in association 3.

are on broad ridgetops and short breaks on uplands. They have a surface layer of dark grayish-brown to dark-brown silt loam. There is a very slowly permeable fragipan at a depth of 28 to 36 inches. These soils are strongly acid to neutral, depending on the amount of lime applied.

The minor soils in this association are mainly Rossmoyne soils on ridgetops and short breaks of the uplands and Cincinnati and Jennings soils on ridgetops and hillsides of the uplands.

The soils in this association are used mainly for cultivated crops. Most of the acreage is used for corn and soybeans, and the rest is used for small grain, hay, and pasture or is wooded. These soils are among the most productive on uplands in the county. Although natural fertility is low, these soils respond well to lime and fertilizer. They also are improved by additions of plant residue and use of deep-rooted legumes.

Excessive wetness is the main limitation in use and management of these soils. This can be reduced by artificial drainage. The very slowly permeable, very firm and brittle layers, or fragipan, restrict the downward movement of water and roots. If the gently sloping areas are cultivated, erosion and runoff are also hazards.

The largest farms in the county are in this association.

4. *Fincastle-Russell-Miami association*

Deep, somewhat poorly drained and well drained, nearly level to strongly sloping soils formed in thin loess and underlying loamy glacial till; on uplands

This soil association consists of nearly level soils on broad ridges, gently sloping soils on ridges and knolls, and moderately sloping to strongly sloping soils on ridges, knolls, and hillsides in the extreme northwestern part of the county. It occupies approximately 1 percent of the county. About 63 percent of this association is Fincastle soils, 13 percent is Russell soils, 8 percent is Miami soils, and 16 percent is minor soils (fig. 5).

Fincastle soils are somewhat poorly drained. They are nearly level on broad ridges and gently sloping on ridges and knolls. These soils have a surface layer of dark grayish-brown to brown silt loam. They are strongly acid to neutral, depending on the amount of lime applied.

Russell soils are well drained. They are gently sloping on ridges and knolls. These soils have a surface

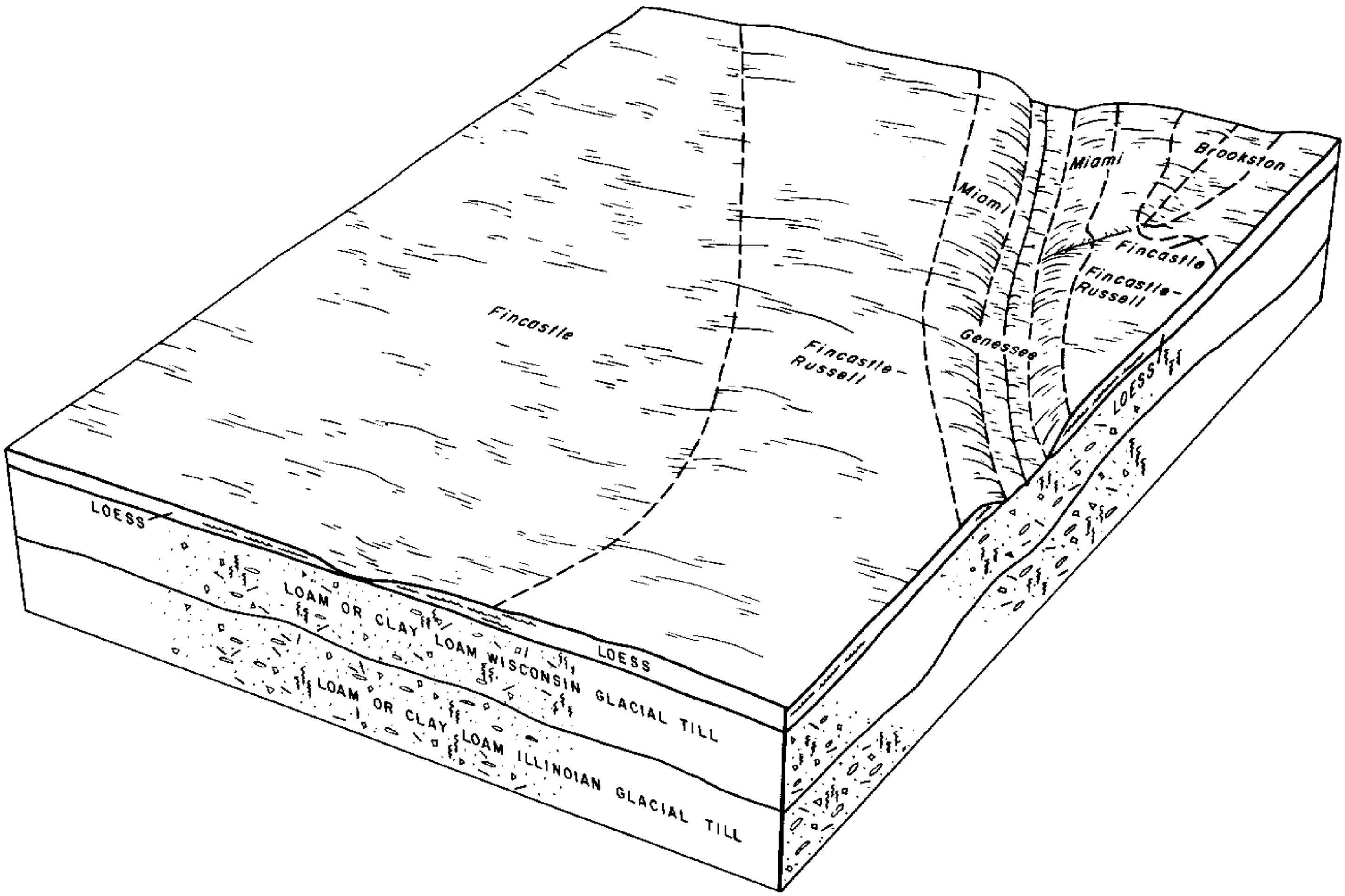

Figure 5. **— Parent material and position of soils in association 4.**

layer of very dark grayish-brown or dark grayish-brown silt loam. Russell soils are strongly acid to neutral, depending on the amount of lime applied. They occur in intricate patterns on the landscape with the Fincastle soils.

Miami soils are well drained. They are moderately sloping and strongly sloping on ridges, knolls, and hillsides. These soils have a surface layer of dark grayish-brown to brown silt loam or clay loam. They are strongly acid to neutral, depending on the amount of lime applied.

The minor soils of this association consist mainly of Brookston soils in slightly depressional areas of the uplands, Hickory soils on hillsides of the uplands, and Genesee, Eel, and Wakeland soils on narrow bottom lands.

The soils in this association are used mainly for cultivated crops. The main crops are corn and soybeans. The rest of the acreage is used for small grain, hay, and pasture. These soils are among the most productive on uplands in the county. They respond well to applications of fertilizer.

The main limitation in use and management is excessive wetness of the Fincastle soils. The wetness can be reduced with tile drains. Erosion control practices are needed on the sloping soils.

5. *Miami-Fincastle-Russell association*

Deep, well drained and somewhat poorly drained, gently sloping to strongly sloping soils formed in thin loess and underlying loamy glacial till; on uplands

This soil association consists mainly of gently sloping to strongly sloping soils on knolls, ridgetops, and hillsides in the extreme northwestern part of the county. It occupies approximately 3 percent of the county. About 24 percent of this association is Miami soils, 12 percent is Fincastle soils, 8 percent is Russell soils, and 56 percent is minor soils (fig. 6).

Miami soils are well drained. They are moderately sloping and strongly sloping on hillsides, ridges, and knolls. These soils have a surface layer of dark grayish-brown to brown silt loam or clay loam. They are strongly acid to neutral, depending on the amount of lime applied.

Fincastle soils are somewhat poorly drained. They

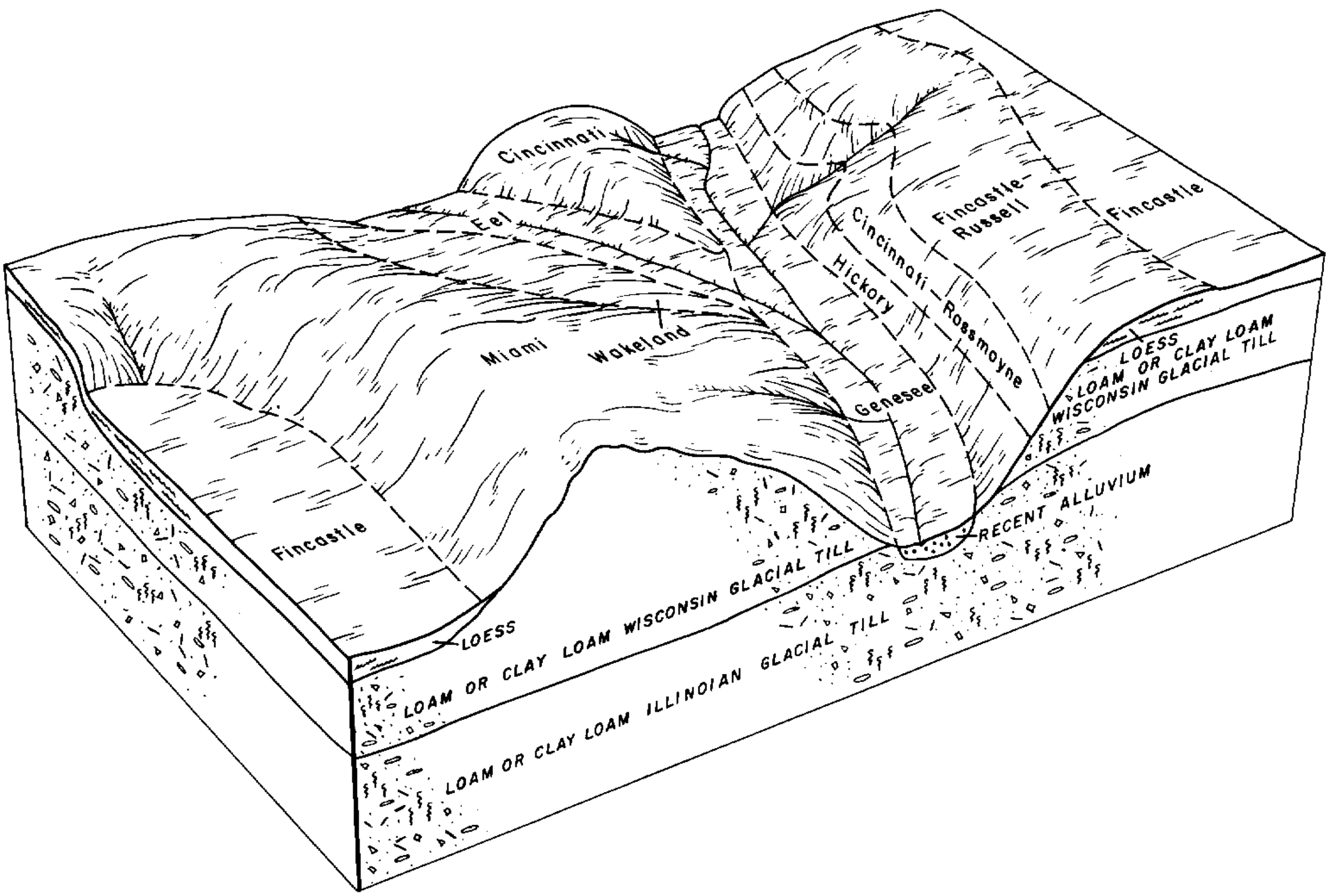

Figure 6. — **Parent material and position of soils in association 5.**

are gently sloping on broad ridges and knolls. These soils have a surface layer of dark grayish-brown to brown silt loam. They are strongly acid to neutral, depending on the amount of lime applied.

Russell soils are well drained. They are gently sloping on ridges and knolls. These soils have a surface layer of very dark grayish-brown or dark grayish- brown silt loam. They are strongly acid to neutral, depending on the amount of lime applied. Russell soils occur in intricate patterns on the landscape with the Fincastle soils.

The minor soils of this association consist mainly of Cincinnati and Rossmoyne soils on ridges and hillsides of the uplands, moderately steep and steep Hickory soils on hillsides of the uplands adjacent to natural drainageways, and Genesee, Eel, and Wakeland soils on bottom lands.

The soils in this association are used mainly for cultivated crops. The main crops are corn and soybeans. The rest of the acreage is used mainly for small grain, hay, or pasture. These soils are among the most productive soils on uplands in the county. They respond well to applications of fertilizer and are improved by addition of plant residues.

Erosion and runoff are the main hazards in the use and management of these soils. Erosion control practices are needed. Excessive wetness is a limitation in the use of Fincastle soils. It can be reduced by artificial drainage.

6. Genesee-Eel association

Deep, well drained and moderately well drained, nearly level soils formed in recent loamy alluvium; on bottom lands

This soil association consists mainly of nearly level soils on flood plains along the larger streams in the northern part of the county. It occupies approximately 3 percent of the county. About 47 percent of this association is Genesee soils, 16 percent is Eel soils, and 37 percent is minor soils.

Genesee soils are well drained. They are in long bands on bottom lands adjacent to streams. These soils have a surface layer of dark-brown to brown loam. They are medium acid or neutral.

Eel soils are moderately well drained. They are in long, narrow areas on bottom lands. These soils have a surface layer of dark-brown to brown silt loam. They are slightly acid or neutral.

The minor soils in this association consist mainly of Wakeland, Haymond, and Wilbur soils on bottom lands, and Elkinsville and Pekin soils on terraces.

The soils in this association are used for corn and soybeans, even though overflow during the growing season occasionally destroys a crop. Small grain and hay are also grown. Some small areas are used for pasture. Flooding is the major hazard in use and management of these soils. This can be reduced by the installation of flood water control structures.

Descriptions of the Soils

This section describes the soil series and mapping units in Jennings County. Each soil series is described in detail, and then, each mapping unit in that series is briefly described. Unless it is specifically mentioned otherwise, it is to be assumed that what is stated about the soil series holds true for the mapping units in that series. Thus, to get full information about any one mapping unit, it is necessary to read both the description of the mapping unit and the description of the soil series to which it belongs.

An important part of the description of each soil series is the soil profile, that is, the sequence of layers from the surface downward to rock or other underlying material. Each series contains two descriptions of this profile. The first is brief and in terms familiar to the layman. The second is much more detailed and is for those who need to make thorough and precise studies of soils. The profile described in the series is representative for mapping units in that series. If the profile of a given mapping unit is different from the one described for the series, these differences are stated in describing the mapping unit, or they are apparent in the name of the mapping unit. Color terms are for moist soil unless otherwise stated.

As mentioned in the section "How This Survey Was Made," not all mapping units are members of a soil series. Gullied land, for example, does not belong to a soil series; but nevertheless is listed in alphabetic order along with the soil series.

Following the name of each mapping unit is a symbol in parentheses. This symbol identifies the mapping unit on the detailed soil map. Listed at the end of each description of a mapping unit is the capability unit and woodland suitability group in which the mapping unit has been placed. The page for the description of each capability unit can be learned by referring to the "Guide to Mapping Units" at the back of this survey.

The names of some soils are unlike those appearing in recently published surveys of adjacent counties. This is due to the change in concepts of soil series in the classification system.

The acreage and proportionate extent of each mapping unit are shown in table 1. The part of Jennings County occupied by the Jefferson Proving Ground was not surveyed. It is listed in table 1 as Federal land. Many of the terms used in describing soils can be found in the Glossary, and more detailed information about the terminology and methods of soil mapping can be obtained from the Soil Survey Manual (*10*).

Avonburg Series

The Avonburg series consists of deep, somewhat poorly drained soils that have a very firm and brittle fragipan beginning at a depth of about 20 to 36 inches. These soils of the uplands are nearly level on broad ridges and gently sloping on broad upland breaks. They formed in loess and the underlying loamy glacial till.

In a representative profile, the surface layer is dark grayish-brown silt loam about 11 inches thick. The subsurface layer is mottled, light brownish-gray silt loam about 7 inches thick. The subsoil extends to a depth of about 81 inches. In sequence from the top, it is 6 inches of mottled, light yellowish-brown to brownish-yellow, friable heavy loam; 11 inches of mottled, gray, firm light silty clay loam; 36 inches of a mottled, gray and yellowish-brown, very firm and very brittle silty clay

loam and light clay loam fragipan; and 10 inches of mottled, yellowish-brown, firm clay loam.

Permeability is very slow in the fragipan. The available water capacity is moderate. The organic-matter content generally is low. Depth to the seasonal high water table is 1 to 3 feet.

Representative profile of Avonburg silt loam, 0 to 2 percent slopes, in a meadow at a point 500 feet north and 500 feet west of the southeast corner of the northwest quarter of sec. 26, T. 6 N., R. 8 E.

Ap—0 to 11 inches, dark grayish-brown (10YR 4/2) silt loam; moderate, medium and fine, granular structure; friable; plentiful roots; neutral; abrupt, smooth boundary.

TABLE 1.—*Approximate acreage and proportionate extent of soils*

Soils	Acres	Percent
Avonburg silt loam, 0 to 2 percent slopes	33,000	13.8
Avonburg silt loam, 2 to 4 percent slopes, eroded	3,250	1.4
Bartle silt loam	1,750	.7
Bonnie silt loam	590	.2
Brookston silty clay loam	95	(1)
Cincinnati silt loam, 2 to 6 percent slopes, eroded	890	.4
Cincinnati silt loam, 6 to 12 percent slopes, eroded	8,300	3.4
Cincinnati silt loam, 6 to 12 percent slopes, severely eroded	6,600	2.7
Cincinnati silt loam, 12 to 18 percent slopes, eroded	2,900	1.2
Cincinnati silt loam, 12 to 18 percent slopes, severely eroded	2,100	.9
Cincinnati-Rossmoyne silt loams, 4 to 10 percent slopes, eroded	20,750	8.6
Clermont silt loam	38,250	16.0
Corydon stony silt loam, 25 to 40 percent slopes	3,700	1.5
Eel silt loam	1,600	.7
Elkinsville silt loam, 0 to 2 percent slopes	960	.4
Elkinsville silt loam, 2 to 6 percent, eroded	402	.2
Elkinsville silt loam, 6 to 12 percent slopes, eroded	560	.2
Fincastle silt loam, 0 to 3 percent slopes	1,200	.5
Fincastle-Russell silt loams, 2 to 6 percent slopes, eroded	3,000	1.2
Genesee loam	3,850	1.6
Grayford silt loam, 2 to 6 percent slopes, eroded	1,500	.6
Grayford silt loam, 6 to 12 percent slopes, eroded	3,000	1.2
Grayford silt loam, 6 to 12 percent slopes, severely eroded	1,350	.6
Grayford silt loam, 12 to 18 percent slopes, eroded	2,750	1.1
Grayford silt loam, 12 to 18 percent slopes, severely eroded	2,200	.9
Grayford-Corydon soils, 18 to 25 percent slopes, eroded	2,850	1.2
Gullied land	1,650	.7
Haymond silt loam	6,500	2.7
Hickory loam, 18 to 25 percent slopes, eroded	8,900	3.7
Hickory loam, 25 to 50 percent slopes	5,500	2.3
Jennings silt loam, 2 to 6 percent slopes, eroded	1,900	.8
Jennings silt loam, 6 to 12 percent slopes, eroded	3,400	1.4
Jennings silt loam, 6 to 12 percent slopes, severely eroded	2,450	1.0
Jennings silt loam, 12 to 18 percent slopes, eroded	800	.3
Jennings silt loam, 12 to 18 percent slopes, severely eroded	600	.2
Miami silt loam, 6 to 12 percent slopes, eroded	770	.3
Miami silt loam, 12 to 18 percent slopes, eroded	330	.1
Miami clay loam, 6 to 12 percent slopes, severely eroded	800	.3
Parke silt loam, 2 to 6 percent slopes, eroded	2,550	1.1
Parke silt loam, 6 to 12 percent slopes, eroded	1,800	.8
Parke silt loam, 6 to 12 percent slopes, severely eroded	910	.4
Pekin silt loam, 0 to 2 percent slopes	239	.1
Pekin silt loam, 2 to 6 percent slopes, eroded	1,950	.8
Pekin silt loam, 6 to 10 percent slopes, eroded	780	.3
Peoga silt loam	263	.1
Rossmoyne silt loam, 0 to 2 percent slopes	1,400	.6
Rossmoyne silt loam, 2 to 6 percent slopes, eroded	21,000	8.8
Rossmoyne silt loam, 2 to 6 percent slopes, severely eroded	1,200	.5
Steff silt loam	810	.3
Stendal silt loam	3,000	1.2
Trappist silt loam, 6 to 12 percent slopes, eroded	900	.4
Trappist silt loam, 12 to 18 percent slopes, eroded	600	.2
Trappist silty clay loam, 6 to 12 percent slopes, severely eroded	1,550	.6
Trappist silty clay loam, 12 to 18 percent slopes, severely eroded	1,100	.5
Wakeland silt loam	6,000	2.5
Weikert shaly silt loam, 18 to 40 percent slopes, eroded	1,250	.5
Wilbur silt loam	3,950	1.6
Federal land	8,800	3.6
Water	231	.1
Total	241,280	100.0

[1]Less than 0.05 percent.

A2—11 to 18 inches, light brownish-gray (10YR 6/2) silt loam; many, medium, distinct, yellowish-brown (10YR 5/4 and 5/6) mottles; weak, medium and thick, platy structure; friable; few roots; neutral; clear, wavy boundary.

B1—18 to 24 inches, light yellowish-brown (10 YR 6/4) to brownish-yellow (10YR 6/6) heavy silt loam; many, medium, distinct, light brownish-gray (10YR 6/2) mottles; weak, medium, subangular blocky structure; friable; few roots, strongly acid; clear, irregular boundary.

B2tg—24 to 35 inches, gray (10YR 6/1) light silty clay loam; many, coarse, distinct, yellowish-brown (10YR 5/6 and 5/8) and dark yellowish-brown (10YR 4/4) mottles; moderate, medium and coarse, prismatic structure parting to moderate, medium, subangular blocky; firm; few roots; few, patchy, distinct, thin, gray (10YR 6/1) clay films on faces of peds and on linings of some voids; many, continuous, prominent, thick, gray (10YR 6/1) silt coatings on faces of prisms; few strong-brown (7.5YR 5/8) concretions; very strongly acid; clear, irregular boundary.

IIBx1g—35 to 46 inches, gray (10YR 6/1) silty clay loam; many, coarse, distinct, yellowish-brown (10YR 5/8) and dark yellowish-brown (10YR 4/4) mottles; strong, coarse and very coarse, prismatic structure parting to weak, thick, platy; very firm, very brittle; common, discontinuous, distinct, thin and medium, light brownish-gray (10YR 6/2) clay films on faces of prisms; many, discontinuous, distinct, gray (10YR 6/1) silt coatings on prismatic faces; few fine pebbles; common strong-brown (7.5YR 5/8) concretions; very strongly acid; gradual, wavy boundary.

IIBx2—46 to 71 inches, yellowish-brown (10YR 5/6) light clay loam; many, coarse, distinct, light brownish-gray (10YR 6/2) and brownish-yellow (10YR 6/6) mottles; strong, very coarse, prismatic or polygonal structure; very firm, very brittle; few concretions; common, discontinuous, distinct, thin to thick, gray (10YR 5/1) clay films on prismatic faces; common, discontinuous, distinct, thick, gray (10YR 6/1) silt coatings on faces of prisms in old root zones and linings of voids; very strongly acid; gradual, wavy boundary.

IIIB3tb—71 to 81 inches, yellowish-brown (10YR 5/6 and 5/8) clay loam; many coarse, distinct, gray (10YR 6/1) mottles; weak, very coarse, prismatic structure; firm; common, discontinuous, distinct, thick, gray (10YR 6/1) clay films; many black iron and manganese segregations or accumulations; few pebbles; slightly acid.

The solum ranges from 60 to 84 inches in thickness. The thickness of loess ranges from 18 to 48 inches. Depth to the fragipan ranges from 20 to 36 inches. The Ap horizon ranges from dark grayish brown (10YR 4/2) to dark brown (10YR 4/3). It is strongly acid to neutral, depending on the amount of lime applied. Between the base of the A horizon and the top of the Bx horizon, the matrix colors range from gray (10YR 5/1) to brownish yellow (10YR 6/6) and the texture is silt loam or silty clay loam. The Bx horizon has matrix colors of gray (10YR 6/1) to brownish yellow (10YR 6/6) and is silty clay loam or light clay loam. The Bx horizon is strongly acid or very strongly acid. The B3 horizon has matrix colors ranging from yellowish brown (10YR 5/6 or 5/8) to light olive brown (2.5Y 5/4) and is loam or clay loam. The B3 horizon ranges from strongly acid to slightly acid.

Avonburg soils formed in materials similar to those of the poorly drained Clermont and moderately well drained Rossmoyne soils. Avonburg soils are adjacent to soils of both series. They are browner in the upper part of the B horizon than Clermont soils but are less brown in the B2t horizon than Rossmoyne soils. Avonburg soils have drainage similar to that of the Bartle soils, but they formed in loess and loamy glacial till, whereas the Bartle soils formed in old, medium-textured alluvium.

Avonburg silt loam, 0 to 2 percent slopes (AvA).—This soil occupies broad ridges on uplands. These areas range from about 40 to 2,000 acres in size. This soil has the profile described as representative for the series.

Included with this soil in mapping were small areas of gently sloping, eroded Avonburg soils. Also included were small areas of poorly drained Clermont soils and nearly level, moderately well drained Rossmoyne soils.

Wetness and the very slowly permeable fragipan are the major limitations in the use and management of this somewhat poorly drained soil. The fragipan restricts root penetration, the downward movement of water, and the absorption of effluent in septic tank absorption fields.

This soil is suited to corn, soybeans, and small grain if a suitable drainage system is established and maintained. Grasses and legumes for forage can also be grown. Capability unit IIw-3; woodland suitability group 5.

Avonburg silt loam, 2 to 4 percent slopes, eroded (AvB2).—This soil occupies broad ridges on uplands. These areas range from about 10 to 80 acres in size. The profile of this soil is similar to that described as representative for the series, but the surface layer is 3 to 9 inches thick.

Included with this soil in mapping were small areas of nearly level Avonburg soils and gently sloping, eroded, moderately well drained Rossmoyne soils. Severely eroded areas less than 3 acres in size are identified on the detailed soil map by a spot symbol.

Runoff and erosion are the major hazards, and wetness and the very slowly permeable fragipan are the major limitations, in the use and management of this somewhat poorly drained soil. The fragipan restricts root penetration, the downward movement of water, and the absorption of effluent in septic tank absorption fields.

This soil is suited to corn, soybeans, and small grain if a suitable drainage system for controlling erosion is established and maintained. Grasses and legumes for forage can also be grown. Capability unit IIe-13; woodland suitability group 5.

Bartle Series

The Bartle series consists of deep, somewhat poorly drained soils that have a very firm and brittle fragipan beginning at a depth of 20 to 36 inches. These soils are nearly level and occupy broad areas on terraces between soils on uplands and soils on bottom lands. They formed in old, medium-textured alluvium.

In a representative profile, the surface layer is dark grayish-brown silt loam about 11 inches thick. The subsurface layer is mottled, light brownish-gray and light-gray silt loam about 4 inches thick. The subsoil extends to a depth of about 60 inches. It is mottled, brown, friable silt loam in the upper 10 inches and has a fragipan of mottled, gray and dark yellowish-brown, very firm and brittle silt loam and light silty clay loam in the lower 35 inches.

Permeability is very slow in the fragipan. The available water capacity is moderate. The organic-matter

content generally is moderate. Runoff is slow. Depth to the seasonal high water table is 1 to 3 feet.

Representative profile of Bartle silt loam, in a cultivated field at a point 300 feet north and 300 feet east of the southwest corner of the southeast quarter of sec. 23, T. 6 N., R. 7 E.

Ap—0 to 11 inches, dark grayish-brown (10YR 4/2) silt loam; moderate, medium, granular structure; friable; neutral; abrupt, smooth boundary.

A2—11 to 15 inches, light brownish-gray (10YR 6/2) and light-gray (10YR 6/1) silt loam with few, fine, distinct, dark yellowish-brown (10YR 4/4) mottles; weak, fine, granular structure; friable; medium acid; clear, irregular boundary.

B1—15 to 25 inches, brown (10YR 5/3) and yellowish-brown (10YR 5/4) silt loam; common, fine, distinct, grayish-brown (10YR 5/2) mottles; moderate, medium, prismatic structure; friable; few, discontinuous, faint, thin, gray (10YR 6/1) clay films on faces on peds and in voids; very strongly acid; clear, wavy boundary.

Bx1g—25 to 37 inches, gray (10YR 6/1) silt loam; common, fine, distinct, yellowish-brown (10YR 5/6) and brown (10YR 5/3) mottles; moderate, very coarse, prismatic structure parting to weak, thick, platy; very firm and brittle; few roots in cracks between peds but none inside peds; common, discontinuous, prominent, thick, gray (10YR 6/1) films and silt coatings on faces of peds; numerous black iron and manganese concretions; very strongly acid; clear, wavy boundary.

Bx2—37 to 60 inches, dark yellowish-brown (10YR 4/4) and dark-brown (10YR 4/3) light silty clay loam; many, medium, distinct, grayish-brown (10YR 5/2) and brown (10YR 5/3) mottles; moderate, very coarse, prismatic structure; very firm and brittle; thick gray (10YR 6/1) clay films and silt coatings on faces of peds; few black iron and manganese concretions; very strongly acid.

The solum ranges from about 54 to 60 inches in thickness. Depth to the fragipan ranges from 20 to 36 inches. The Ap horizon ranges from dark grayish brown (10YR 4/2) to yellowish brown (10YR 5/4). It is strongly acid to neutral, depending on the amount of lime applied. Between the base of the A horizon and the top of the Bx horizon, the matrix colors range from brown (10YR 5/3) to light gray (10YR 7/2), and the texture is silt loam or silty clay loam. The Bx horizon has matrix colors ranging from gray (10YR 6/1) to yellowish brown (10YR 5/6) and is silt loam or silty clay loam.

Bartle soils are adjacent to the moderately well drained Pekin soils and the poorly drained Peoga soils. They have mottling in the B1 horizon, but the Pekin soils do not. They have a less gray B1 horizon than the Peoga soils. Bartle soils have drainage similar to that of the Avonburg soils, but they formed in old, medium-textured alluvium, whereas the Avonburg soils formed in loess and loamy glacial till.

Bartle silt loam (0 to 2 percent slopes) (Ba).—This soil occupies broad areas on terraces. These areas range from about 10 to 150 acres in size.

Included with this soil in mapping were small areas of gently sloping, eroded Bartle soils and small areas of nearly level and gently sloping, moderately well drained Pekin soils.

Wetness and the very slowly permeable fragipan are the major limitations in the use and management of this somewhat poorly drained soil. The fragipan restricts root penetration, the downward movement of water, and the absorption of effluent from septic tank absorption fields.

This soil is suited to corn, soybeans, and small grain if a suitable drainage system is established and maintained. Grasses and legumes for forage can also be grown. Capability unit IIw-3; woodland suitability group 5.

Bonnie Series

The Bonnie series consists of deep, poorly drained to very poorly drained soils that are nearly level and occupy low broad or slightly depressional areas on bottom lands. These soils are adjacent to higher-lying soils on terraces or uplands. They formed in recent medium-textured alluvium.

In a representative profile, the surface layer is mottled grayish-brown silt loam about 8 inches thick. The underlying material to a depth of about 40 inches is mottled gray, friable silt loam. Below this, to a depth of about 72 inches, it is mottled gray silt loam.

Permeability is slow, and the available water capacity is very high. The organic-matter content is low. These soils are subject to flooding, and runoff is slow to ponded. Depth to the seasonal high water table is 0 to 1 foot.

Representative profile of Bonnie silt loam, in a wooded area at a point 200 feet east and 1,000 feet north of the southwest corner of the northwest quarter of sec. 6, T. 5 N., R. 7 E.

A1—0 to 8 inches, grayish-brown (10YR 5/2) silt loam; few, fine, faint, dark-brown (10YR 4/3), brown (10YR 5/3), and yellowish-brown (10YR 5/6) mottles; moderate, fine, granular structure; friable; plentiful small roots; strongly acid; abrupt, smooth boundary.

C1g—8 to 30 inches, gray (10YR 6/1) silt loam; common, fine, distinct, brown (10YR 5/3) and yellowish-brown (10YR 5/6) mottles; moderate, medium, granular structure; friable; few, small roots; strongly acid, clear, smooth boundary.

C2g—30 to 40 inches, gray (10YR 6/1) silt loam; common, fine, distinct, yellowish-brown (10YR 5/6) mottles; weak, medium, subangular blocky structure; friable; strongly acid; clear, smooth boundary.

C3g—40 to 56 inches, gray (10YR 5/1) silt loam; common, fine, prominent, strong-brown (7.5YR 5/6) mottles, common, fine, distinct, yellowish-brown (10YR 5/6) mottles; and common, fine, faint, gray (10YR 6/1) mottles; massive; friable; depositional strata; few, small, black (10YR 2/1) and very dark-brown (10YR 2/2) iron and manganese concretions; strongly acid; clear, smooth boundary.

C4g—56 to 72 inches, gray (10YR 5/1) heavy silt loam; many, fine, distinct, brown (10YR 5/3) and yellowish-brown (10YR 5/4 and 5/6) mottles; massive; thin depositional strata; many, small, black (10YR 2/1) and very dark-brown (10YR 2/2) iron and manganese concretions; strongly acid.

The A and C horizons are dominantly strongly acid or very strongly acid. The A1 horizon ranges from light gray (10YR 7/1) to grayish brown (10YR 5/2). The C1g and C2g horizons have matrix colors of gray (10YR 5/1) to light gray (2.5Y 7/2). The C3g and C4g horizons have stratified layers ranging from loam to silty clay loam.

Bonnie soils are adjacent to the somewhat poorly drained Stendal soils. They are grayer in the upper part and are wetter than the Stendal soils. Bonnie soils have similar drainage to Peoga soils but are less clayey below the A horizon. Bonnie soils formed in recent medium-textured alluvium, whereas Peoga soils formed in old medium-textured alluvium.

Bonnie silt loam (0 to 2 percent slopes) (Bo).—This nearly level or slightly depressed soil occupies low, broad areas on bottom lands adjacent to higher terraces or uplands. The areas of this soil range from about 10 to 80 acres in size.

Included with this soil in mapping were small areas of nearly level, somewhat poorly drained Stendal soils.

Flooding is the major hazard, and wetness is the major limitation in the use and management of this poorly drained to very poorly drained soil. Because of flooding, wetness, and slow permeability, the absorption of effluent in septic tank absorption fields is restricted.

This soil is suited to corn and soybeans if a suitable drainage system is established and maintained. Artificial drainage is difficult to establish because of the low position of this soil and the difficulty in obtaining suitable drainage outlets. This soil is better suited to grasses and legumes for forage and to woodland than to most other crops in areas that are too wet for corn and soybeans. Capability unit IIIw–10; woodland suitability group 11.

Brookston Series

The Brookston series consists of deep, very poorly drained, nearly level soils in low or slight depressional areas on uplands. These soils formed in loamy sediment derived from till and the underlying till.

In a representative profile, the surface layer is very dark grayish-brown and very dark gray silty clay loam about 16 inches thick. The subsoil extends to a depth of about 48 inches. It is mottled dark-gray, firm silty clay loam in the upper 4 inches and mottled dark-gray, grayish-brown, and yellowish-brown, firm clay loam in the lower 28 inches. The underlying material, to a depth of about 72 inches, is mottled brown, yellowish-brown, and light brownish-gray loam.

Permeability is slow. The available water capacity and organic-matter content are high. Runoff is very slow or ponded. Depth to the seasonal high water table is 0 to 1 foot.

Representative profile of Brookston silty clay loam, in a cultivated field at a point 20 feet south and 320 feet west of the northeast corner of sec. 22, T. 8 N., R. 7 E.

Ap—0 to 9 inches, very dark grayish-brown (10YR 3/2) light silty clay loam; weak, medium, granular structure; firm; plentiful roots; neutral; abrupt, smooth boundary.

A12—9 to 16 inches, very dark-gray (10YR 3/1) silty clay loam; weak, medium, granular structure; firm; black (10YR 2/1) organic coatings on faces of some peds and in cracks; neutral; clear, smooth boundary.

B1g—16 to 20 inches, dark-gray (10YR 4/1) silty clay loam; common, medium, distinct, grayish-brown (2.5Y 5/2) and light olive-brown (2.5Y 5/4) mottles, moderate, medium, subangular blocky structure; firm; very dark brown (10YR 2/2) organic coatings on faces of some peds; about 15 to 20 percent fine sand; neutral; clear, smooth boundary.

IIB21tg—20 to 30 inches, dark-gray (10YR 4/1) clay loam; common, medium, distinct, yellowish-brown (10YR 5/6), grayish-brown (2.5Y 5/2), and olive-brown (2.5Y 4/4) mottles; weak, medium, prismatic structure parting to moderate, medium, subangular and angular blocky; firm; discontinuous, thin, dark-gray (N 4/0) clay films on faces of peds; neutral; clear, smooth boundary.

IIB22tg—30 to 42 inches, grayish-brown (2.5Y 5/2) clay loam; many, medium, yellowish-brown (10YR 5/6) and olive-brown (2.5Y 4/4) mottles; moderate, coarse, subangular blocky structure; firm; few fine pores less than 1 millimeter in diameter inside peds; pores have grayish-brown (10YR 5/2) linings; discontinuous thin dark-gray (N 4/0) clay films; neutral; gradual, smooth boundary.

IIB3—42 to 48 inches, yellowish-brown (10YR 5/6) clay loam; many, medium, distinct, grayish-brown (10YR 5/2 and 2.5Y 5/2) mottles; weak, very coarse, subangular blocky structure; firm, few fine pores that have grayish-brown (10YR 5/2) linings; grayish-brown (10YR 5/2) clay films in some vertical cracks; neutral; clear, wavy boundary.

IIC—48 to 72 inches, mottled brown (10YR 5/3), yellowish-brown (10YR 5/6), and light brownish-gray (10YR 6/2) loam till; very fine; compact; moderately alkaline; calcareous.

Thickness of the solum ranges from 30 to 50 inches. Depth to carbonates ranges from 30 to 60 inches. The Ap horizon ranges from black (10YR 2/1) to very dark grayish-brown (10YR 3/2) and is silty clay loam or light silty clay loam. The B1g horizon ranges from dark-gray (10YR 4/1) to gray (10YR 5/1) to grayish brown (10YR 5/2) and is silty clay loam or clay loam. The B2 horizon ranges from dark gray (10YR 4/1) to olive gray (5Y 5/2) and from clay loam to silty clay loam. Sand makes up more than 15 percent of the horizon. The B3 horizon is loam or clay loam. The C horizon is loam or light clay loam, and with increasing depth, it is more compact.

Brookston soils are adjacent to the somewhat poorly drained Fincastle soils. They formed in loamy sediment and loamy glacial till, whereas the Fincastle soils formed in loess and loamy glacial till. Brookston soils have a darker A horizon and are grayer in the upper part of the B horizon than the Fincastle soils.

Brookston silty clay loam (0 to 2 percent slopes) (Br).—This nearly level or slightly depressed soil occupies low areas on uplands. These areas range from about 3 to 10 acres in size.

Included with this soil in mapping were small areas of nearly level, somewhat poorly drained Fincastle soils. Also included were areas of Brookston soils that have a surface layer of silt loam, and areas of very poorly drained soils that have 10 to 20 inches of grayish-brown or dark grayish-brown silt loam overwash.

Wetness is the major limitation in the use and management of this very poorly drained soil. Because the surface layer has the texture of silty clay loam, this soil is subject to puddling. It becomes hard and cloddy if it is worked when wet. Because of wetness and slow permeability, the absorption of effluent is restricted in septic tank absorption fields.

This soil is suited to corn, soybeans, and small grain if a suitable drainage system is established and maintained. Grasses and legumes for forage can also be grown. Capability unit IIw–1; woodland suitability group 11.

Cincinnati Series

The Cincinnati series consists of deep, well-drained soils that have a very firm and brittle fragipan beginning at a depth of 20 to 30 inches. These soils of the uplands are gently sloping to moderately sloping on narrow ridges and breaks, and they are moderately sloping and strongly sloping on hillsides. They formed in loess and the underlying loamy glacial till.

In a representative profile, the surface layer is brown silt loam about 9 inches thick. The subsoil extends to a depth of 72 inches. In sequence from the top, the subsoil is 11 inches of dark-brown, friable and firm heavy silt loam; 7 inches of strong-brown, firm light silty clay loam; 25 inches of a mottled yellowish-brown and pale-brown, very firm and very brittle loam fragipan; and 20 inches of strong-brown and light olive-brown, firm heavy clay loam.

Permeability is very slow in the fragipan. The available water capacity is moderate, and the organic-matter content is low.

Representative profile of Cincinnati silt loam, 6 to 12 percent slopes, eroded, in a meadow at a point in the center of sec. 23, T. 6 N., R. 8 E.

Ap—0 to 9 inches, brown (10YR 5/3) silt loam; moderate, medium and fine, granular structure; friable; neutral; abrupt, smooth boundary.

B1—9 to 13 inches, dark-brown (7.5YR 4/4) heavy silt loam; weak, medium, subangular blockly structure; friable; few, patchy, distinct, thin, pale-brown (10YR 6/3) silt coatings on faces of peds; neutral; clear, wavy, boundary.

B21t—13 to 20 inches, dark-brown (7.5YR 4/4) heavy silt loam; moderate, medium, subangular blocky structure; firm; few, patchy, distinct, pale-brown (10YR 6/3) silt coatings on faces of peds and in old voids; few, light brownish-gray (10YR 6/2) coatings around old root zones; patchy, distinct, thin, dark-brown (7.5YR 4/4) clay films on faces of few peds; strongly acid; clear, wavy boundary.

B22t—20 to 27 inches, strong-brown (7.5YR 5/6) light silty clay loam; moderate, medium, subangular blocky structure; firm; common, fine, prominent, light brownish-gray (10YR 6/2) mottles; common, discontinuous, distinct, pale-brown (10YR 6/3) silt coatings on faces of peds and as linings in pores; few, patchy, distinct, thin, dark-brown (7.5YR 4/4) clay films on faces of peds; few, fine, soft accumulations of iron and manganese; very strongly acid; clear, irregular boundary.

IIBx1—27 to 37 inches, yellowish-brown (10YR 5/4) heavy loam; common, medium, distinct, light brownish-gray (10YR 6/2) mottles; strong, very coarse, prismatic structure parting to moderate, medium to thick, platy; very fine, very brittle; common, discontinuous, distinct, thin and medium, gray (10YR 5/1) clay films and silt coatings on faces of prisms; common, discontinuous, distinct, thin and medium, brown (7.5YR 4/4) clay films on horizontal faces of platy peds; few pebbles; very strongly acid; gradual, wavy boundary.

IIBx2—37 to 52 inches, pale-brown (10YR 6/3) loam; strong, very coarse, prismatic structure; very fine, very brittle; many, continuous, distinct, thick, dark-gray (10YR 4/1) clay films and silt coatings on faces of prisms; discontinuous, distinct, thin, yellowish-brown (10YR 5/4) clay films in few pores; 15 percent fine gravel; very strongly acid; clear, wavy boundary.

IIIB3b—52 to 72 inches, strong-brown (7.5YR 5/8) and light olive-brown (2.5YR 5/4) heavy clay loam; weak, coarse, prismatic structure; firm; common, discontinuous, distinct, medium and thick, brown and gray clay films on faces of prisms; 10 to 15 percent fine gravel; slightly acid.

The solum ranges from 60 to 96 inches in thickness. The thickness of loess ranges from 20 to 40 inches. Depth to the fragipan ranges from 20 to 30 inches. The Ap horizon is dark grayish brown (10YR 4/2) to brown (10YR 5/3). It is very strongly acid to neutral, depending on the amount of lime applied. Between the base of the Ap horizon and the top of the Bx horizon the matrix colors are dark brown (7.5YR 4/4) to yellowish brown (10YR 5/6) and the texture is silt loam or silty clay loam. The Bx horizon has matrix colors of strong brown (7.5YR 5/6) to pale brown (10YR 6/3) and is loam or clay loam. The horizon is strongly acid or very strongly acid. The B3 horizon has matrix colors ranging from strong brown (7.5YR 5/6) to light olive brown (2.5YR 5/4) and is loam or clay loam. The B3 horizon ranges from slightly acid to strongly acid.

Cincinnati soils are adjacent to the moderately well drained Rossmoyne soils. They have a browner B horizon than Rossmoyne soils. Cincinnati soils have drainage similar to that of Trappist and Grayford soils, but they have a fragipan and a yellower and less clayey B horizon than Trappist and Grayford soils. They have a thicker solum than Jennings soils.

Cincinnati silt loam, 2 to 6 percent slopes, eroded (CnB2).—This soil occupies narrow ridges, and short breaks between nearly level ridges and sloping hillsides on uplands. These areas range from about 10 to 60 acres in size. The profile of this soil is similar to that described as representative for the series, but it has a thicker mantle of loess, is deeper to the fragipan, and has a fragipan that is not so well developed.

Included with this soil in mapping were small acres of nearly level Cincinnati, Rossmoyne, and Jennings soils. Severely eroded areas less than 3 acres in size are identified on the detailed soil map by a spot symbol.

Runoff and erosion are the major hazards, and the very slowly permeable fragipan is the major limitation in the use and management of this soil. The fragipan restricts root growth, the downward movement of water, and the absorption of effluent in septic tank absorption fields.

This soil is suited to corn, soybeans, and small grain if a suitable system for controlling erosion is established and maintained. Grasses and legumes for forage can also be grown. Capability unit IIe–7; woodland suitability group 9.

Cincinnati silt loam, 6 to 12 percent slopes, eroded (CnC2).—This soil is on narrow ridges and broad hillsides on uplands. These areas range from about 20 to 200 acres in size. This soil has the profile described as representative for the series.

Included with this soil in mapping were small areas of gently sloping and strongly sloping, eroded Cincinnati soils. Also included were small areas of Grayford and Jennings soils that are moderately sloping, eroded, and well drained. Severely eroded areas less than 3 acres in size are identified on the detailed soil map by a spot symbol.

Runoff and erosion are the major hazards, and the very slowly permeable fragipan is the major limitation, in the use and management of this soil. The fragipan restricts root growth, the downward movement of water, and the absorption of effluent in septic tank absorption fields.

This soil is suited to corn, soybeans, and small grain if a suitable erosion control system is established and maintained. Grasses and legumes for forage can also be grown. Ponds have been built in several areas, and these provide water for livestock in adjacent pastures (fig. 7). Capability unit IIIe–7; woodland suitability group 9.

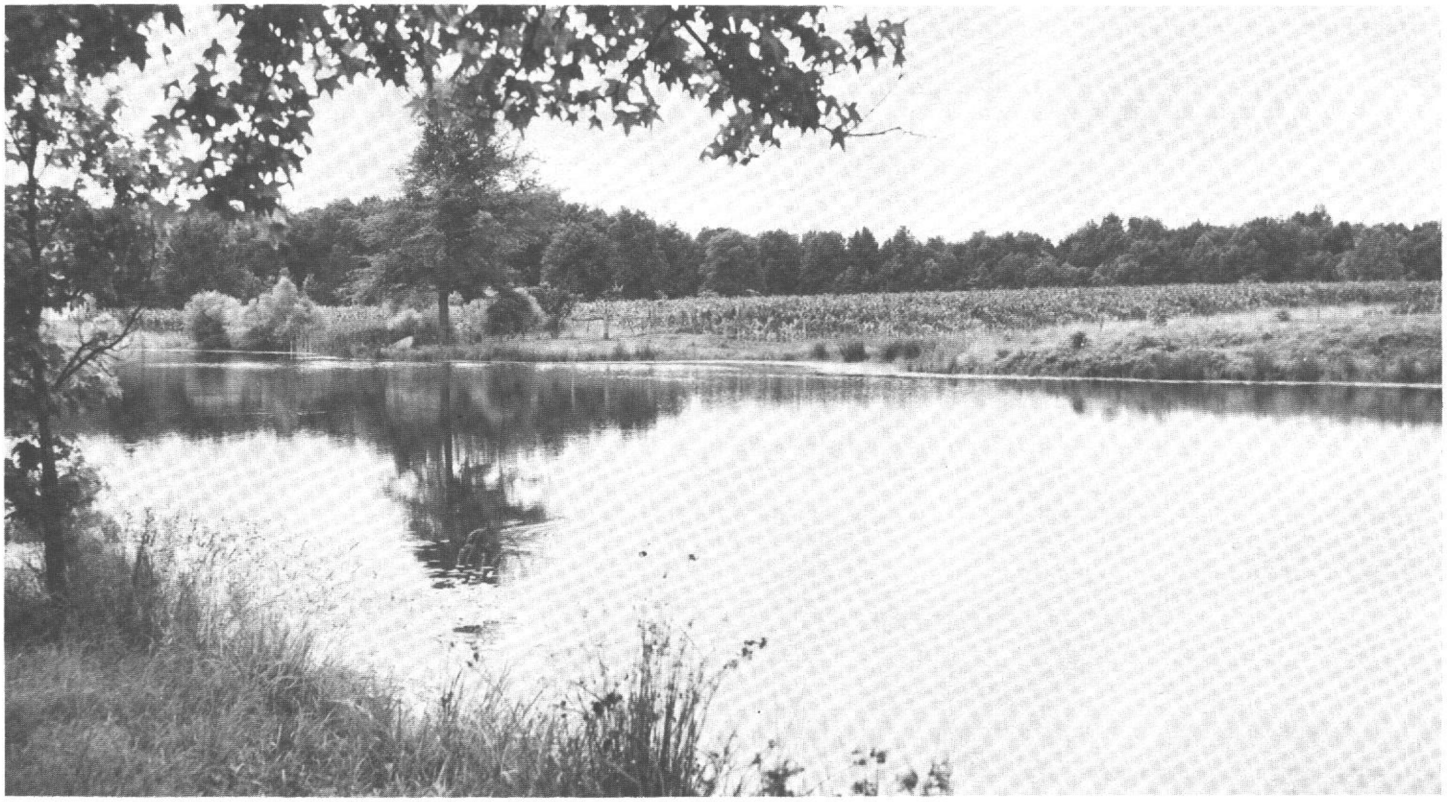

Figure 7. — **Pond that provides water for livestock in nearby pasture. It also is used for family recreation. The soil is Cincinnati silt loam, 6 to 12 percent slopes, eroded.**

Cincinnati silt loam, 6 to 12 percent slopes, severely eroded (CnC3).—This soil occupies narrow ridges and broad hillsides on uplands. These areas range from about 10 to 150 acres in size. The profile of this soil is similar to that described as representative for the series, but the surface layer is less than 3 inches thick. Also, the surface layer is less friable, is lower in organic-matter content and fertility, and is more difficult to keep in good tilth.

Included with this soil in mapping were small areas of moderately sloping Cincinnati soils that are less eroded than this soil, and strongly sloping Cincinnati soils that are severely eroded. Also included were Grayford and Jennings soils that are moderately sloping, severely eroded, and well drained. Gullies and very severely eroded areas are identified on the detailed soil map by spot symbols.

Runoff and erosion are the major hazards in the use and management of this soil. The main limitation is the very slowly permeable fragipan, which restricts root growth, the downward movement of water, and the absorption of effluent in septic tank absorption fields.

This soil is suited to small grain and to grasses and legumes for forage if a suitable system for controlling erosion is established and maintained. The risk of erosion limits use of the soil for row crops. Capability unit IVe–7; woodland suitability group 9.

Cincinnati silt loam, 12 to 18 percent slopes, eroded (CnD2).—This soil is on narrow ridges and broad hillsides on uplands. These areas range from about 10 to 150 acres in size. The profile of this soil is similar to the one described as representative for the series, but it has a thinner mantle of loess, is shallower to the fragipan, and has a fragipan that is not so well developed.

Included with this soil in mapping were small areas of Cincinnati soils that are strongly sloping and severely eroded. Also included were small areas of Hickory, Grayford, and Jennings soils that are strongly sloping, eroded, and well drained. Severely eroded areas less than 3 acres in size are identified on the detailed soil map by a spot symbol.

Runoff and erosion are the major hazards, and the very slowly permeable fragipan is the major limitation, in the use and management of this soil. The fragipan restricts root growth, the downward movement of water, and the absorption of effluent in septic tank absorption fields.

This soil is suited to small grain and to grasses and legumes for forage if a suitable erosion control system is established and maintained. The hazard of erosion limits use of the soil for row crops. Capability Unit IVe–7; woodland suitability group 9.

Cincinnati silt loam, 12 to 18 percent slopes, severely eroded (CnD3).—This soil is on narrow ridges and broad hillsides on uplands. These areas range from about 10 to 100 acres in size. The profile of this soil is similar to that described as representative for the series, but it has a thinner mantle of loess, is shallower to the fragipan, and has a fragipan that is not so well developed. In addition, the surface layer is less than

3 inches thick and is less friable, lower in organic-matter content and fertility, and more difficult to keep in good tilth.

Included with this soil in mapping were small areas of strongly sloping Cincinnati soils that are less eroded than this soil. Also included were small areas of Hickory, Grayford, and Jennings soils that are strongly sloping and severely eroded. Gullies and very severely eroded areas are identified on the detailed soil map by spot symbols.

Runoff and erosion are the major hazards in the use and management of this soil. The major limitation is the very slowly permeable fragipan, which restricts root growth, the downward movement of water, and the absorption of effluent in septic tank absorption fields.

This soil is suited to grasses and legumes for forage if a suitable system that controls erosion is established and maintained. Some areas are used as woodland. Capability unit VIe–1; woodland suitability group 9.

Cincinnati-Rossmoyne silt loams, 4 to 10 percent slopes, eroded (CoC2).—This complex is on narrow ridges, short breaks, and hillsides on uplands adjacent to drainageways or to steeper slopes. These areas range from about 40 to 500 acres in size.

About 45 percent of the complex is well drained Cincinnati silt loam, and about 35 percent is moderately well drained Rossmoyne silt loam. The remaining 20 percent is small included areas of deep, somewhat poorly drained Avonburg soils and deep, well-drained Grayford and Jennings soils. Severely eroded areas less than 3 acres in size are identified on the detailed soil map by spot symbols.

Runoff and erosion are the major hazards, and the very slowly permeable fragipan is the major limitation in the use and management of these soils. The fragipan restricts root growth, the downward movement of water, and the absorption of effluent in septic tank absorption fields.

Soils of this complex are suited to corn, soybeans, and small grain if an erosion control system is established and maintained. Grasses and legumes for forage can also be grown. Capability unit IIIe–7; woodland suitability group 9.

Clermont Series

The Clermont series consists of deep, nearly level, poorly drained soils that have very firm and brittle layers beginning at a depth of 30 to 48 inches. These soils of the uplands are on high, broad ridges. They formed in loess and the underlying loamy glacial till.

In a representative profile, the surface layer is grayish-brown silt loam about 7 inches thick. The subsurface layer is mottled light-gray silt loam about 13 inches thick. The subsoil extends to a depth of about 80 inches. In sequence from the top, it is 20 inches of mottled light-gray and gray, friable, firm and very firm silt loam and silty clay loam; 30 inches of mottled gray and yellowish-brown, very firm and firm, very brittle and brittle clay loam and silt loam fragipan; and 10 inches of mottled yellowish-brown, firm loam.

Permeability is very slow below a depth of about 40 inches. The available water capacity is moderate. The organic-matter content is low. Runoff is slow. Depth to the seasonal high water table is 0 to 1 foot.

Representative profile of Clermont silt loam, in a cultivated field at a point 30 feet north and 900 feet east of the southwest corner of sec. 26, T. 6 N., R. 8 E.

Ap—0 to 7 inches, grayish-brown (10YR 5/2) silt loam; moderate, fine, granular structure; friable; plentiful roots; neutral; abrupt, smooth boundary.

A21g—7 to 11 inches, light-gray (10YR 7/1) silt loam; common, medium, distinct, light yellowish-brown (10YR 6/4) mottles; weak, medium, platy structure; friable; many, fine, soft iron and manganese accumulations; common roots; slightly acid; clear, irregular boundary.

A22g—11 to 20 inches, light-gray (10YR 7/1) silt loam; many, coarse, distinct, brownish-yellow (10YR 6/6) mottles; weak, thick, platy structure; friable; few roots; common black (10YR 2/1) and yellowish-brown (10YR 5/8) iron and manganese accumulations; very strongly acid; clear, irregular boundary.

B1g—20 to 30 inches, light-gray (10YR 7/1) silt loam; many, coarse, distinct, brownish-yellow (10YR 6/6) mottles; weak, medium, prismatic structure parting to weak, medium and coarse, subangular blocky; friable; few roots; many, continuous, prominent, thick, light-gray (10YR 7/2) silt coatings on faces of prisms; common, patchy, distinct, thin gray (10YR 5/1) clay films on faces of prisms and in some pore linings; common, fine black (10YR 2/1) and yellowish-brown (10YR 5/8) iron and manganese accumulations; very strongly acid; clear, irregular horizon.

IIB2tg—30 to 40 inches, gray (10YR 6/1) silty clay loam; many, coarse, distinct, strong-brown (7.5YR 5/6 and 5/8) mottles; strong, medium to coarse, prismatic structure parting to moderate, coarse, angular blocky; firm to very firm, slightly brittle; continuous, prominent, thick, gray (10YR 6/1) silt coatings on all faces of prisms; continuous, distinct, thin and medium, gray (10YR 5/1) clay film on faces of prisms and in linings of pores; common iron and manganese accumulations; very strongly acid; clear, irregular boundary.

11Bx1g—40 to 61 inches, gray (10YR 6/1) clay loam; many, coarse, distinct, strong-brown (7.5YR 5/6) mottles; strong, very coarse, prismatic structure parting to weak, thick, platy; very firm; 40 to 50 percent, by volume, is very brittle; many, continuous, prominent, thick, gray (10YR 6/1) silt coatings on faces of prisms; many, continuous, prominent, medium and thick, gray (10YR 5/1) clay films on faces of prisms and a few in linings of voids; many iron and manganese concretions or accumulations; a few fine pebbles; very strongly acid; gradual, wavy boundary.

IIBx2g—61 to 70 inches, yellowish-brown (10YR 5/6) silt loam; many, coarse, distinct, gray (10YR 6/1) and strong-brown (7.5YR 5/6) mottles; very strong, coarse and very coarse, prismatic structure; firm; 40 to 50 percent, by volume, is brittle; many, continuous, prominent, thick, light brownish-gray (10YR 6/2) silt coatings on faces of prisms; many, continuous, prominent, medium and thick, grayish-brown (10YR 5/2) clay films on faces of prisms and in linings of voids; common iron and manganese concretions and soft accumulations; very strongly acid; gradual, wavy boundary.

IIB3t—70 to 80 inches, yellowish-brown (10YR 5/4 or 5/6) loam; many, coarse, distinct, light brownish-gray (10YR 6/2) and strong-brown (7.5YR 5/6) mottles; moderate or weak, very coarse, prismatic structure; firm; few fine roots on faces of prisms; many, continuous, prominent, medium and thick, light brownish-gray (10YR 6/2) silt coatings and clay films on faces of prisms and in a few voids; common iron and manganese concretions and soft accumulations; few fine pebbles; very strongly acid.

Thickness of the solum ranges from 72 to 96 inches. Thickness of loess ranges from 35 to 48 inches. Depth to a very firm and brittle layer ranges from 30 to 48 inches. The Ap horizon is grayish brown (10YR 5/2) to gray (N 6/0). It is strongly acid to neutral, depending on the amount of lime applied. The Bx horizon has matrix colors of gray (10YR 6/1) to brownish yellow (10YR 6/8) and ranges from silt loam to clay loam. The Bx horizon is strongly acid or very strongly acid. The B3 horizon has matrix colors ranging from yellowish brown (10YR 5/4 or 5/6) to light olive brown (2.5YR 5/4) and is loam or clay loam. The B3 horizon is very strongly acid to slightly acid.

Clermont soils are adjacent to the somewhat poorly drained Avonburg soils, and they formed in similar material. They are less brown in the upper part of the B horizon than those soils. Clermont soils have drainage similar to that of Bonnie and Peoga soils, but unlike the Bonnie soils they have very firm and brittle layers below a depth of 30 to 48 inches. Clermont soils have a thicker solum than Peoga soils. They formed in loess and loamy glacial till, whereas Bonnie soils formed in recent medium-textured alluvium and the Peoga soils formed in old medium-textured alluvium.

Clermont silt loam (0 to 2 percent slopes) (Cr).—This soil occupies high, broad ridges of uplands. The areas range from about 100 to 15,000 acres in size.

Included with this soil in mapping were small areas of nearly level, somewhat poorly drained Avonburg soils. Also included were areas of Clermont soils that have been disturbed by heavy equipment. In some places the upper 10 to 20 inches of soil has been removed, exposing the light-gray subsurface and subsoil. These disturbed areas are in the northwest corner of sec. 23, T. 7 N., R. 8 E.; in the southwest corner of sec. 14, T. 7 N., R. 8 E.; and in the south half of sec. 22, T. 8 N., R. 9 E. Wet spots that are 2 acres or less in size are identified on the detailed soil map by a spot symbol.

Wetness and the very slow permeability are the major limitations in the use and management of this poorly drained soil. The very slowly permeable layer restricts the downward movement of water and the absorption of effluent in septic tank absorption fields.

Figure 8. — **Soybeans in a field that has been artificially drained. The soil is Clermont silt loam.**

This soil is suited to corn and soybeans if a suitable drainage system is established and maintained (fig. 8). Capability unit IIIw–12; woodland suitability group 11.

Corydon Series

The Corydon series consists of shallow, steep to very steep, well-drained soils. These soils of the uplands are on hillsides adjacent to natural drainageways. They formed in residuum weathered from cherty limestone.

In a representative profile, the surface layer is dark-brown stony silt loam about 8 inches thick. The subsoil is strong-brown firm clay about 8 inches thick. Limestone bedrock is at a depth of about 16 inches.

Permeability is moderately slow, and the available water capacity is very low. The organic-matter content is moderate. Runoff is very rapid.

Representative profile of Corydon stony silt loam, 25

to 40 percent slopes, in a wooded area at a point 400 feet west and 1,250 feet north of the southeast corner of the southwest quarter of sec. 2, T. 6 N., R. 8 E.

O1—1 inch to 0, loose, undecomposed hardwood leaves and twigs.

A1—0 to 8 inches, dark-brown (10YR 3/3) stony silt loam; moderate, fine and medium, granular structure; friable; plentiful small roots; neutral; abrupt, smooth boundary.

B2t—8 to 16 inches, strong-brown (7.5YR 5/6) clay; moderate and strong, medium, angular blocky structure; firm; few small roots; few, discontinuous, thin, dark-brown (7.5YR 4/4) clay films on faces of peds and in linings of voids; few, thin dark-brown (10YR 3/3) silt coatings in root channels; few iron and manganese concretions; neutral, except mildly alkaline about one-half inch above limestone bedrock; abrupt, irregular boundary.

R—16 inches, limestone bedrock.

The solum ranges from about 10 to 20 inches in thickness and from neutral to moderately alkaline. Depth to limestone bedrock ranges from 10 to 20 inches. Stones on the surface range from 10 to 20 inches in diameter and are 20 to more than 40 feet apart. The A1 horizon ranges from black (10YR 2/1) to dark brown (10YR 3/3) and is stony silt loam or silty clay loam. The B horizon ranges from dark brown (10YR 4/3) to reddish brown (5YR 4/4) or yellowish red (5YR 5/6) and is silty clay or clay.

Corydon soils are adjacent to the well-drained Grayford soils that have a thicker solum and are deeper to bedrock. Corydon soils have drainage similar to that of Weikert soils, and they have similar depth to bedrock. The Corydon soils formed in residuum weathered from cherty limestone bedrock, whereas Weikert soils formed in residuum weathered from shale. They have less acid and a more clayey B horizon than the Weikert soils.

Corydon stony silt loam, 25 to 40 percent slopes (CyF).—This soil occupies hillsides adjacent to natural drainageways on uplands. These areas range from about 10 to 150 acres in size. In some places there are limestone rock outcrops. Generally, the stones are more than 10 inches in diameter and are 20 to more than 40 feet apart.

Included with this soil in mapping were small areas of moderately steep, eroded Grayford and Hickory soils. Also included were areas of moderately steep to very steep, eroded Weikert soils and nearly level Haymond soils. Areas of rock outcrop, sinkholes, and escarpments other than bedrock are identified on the detailed soil map by spot symbols.

Runoff and erosion are the major hazards. Shallowness and very low available water capacity are the major limitations in the use and management of this well-drained soil.

This soil is used for permanent pasture or woodland, but it is better suited to woodland because of the runoff and the hazard of erosion. Capability unit VIIe–2; woodland suitability group 7.

Eel Series

The Eel series consists of deep, nearly level, moderately well drained soils. These soils occupy long, narrow bands on bottom lands. They formed in recent, medium-textured alluvium.

In a representative profile, the surface layer is brown silt loam about 13 inches thick. The underlying material to a depth of about 44 inches is mottled, yellowish-brown and pale-brown, friable loam. Below this and extending to a depth of about 60 inches, it is mottled yellowish-brown, stratified loam and fine sandy loam.

Permeability is moderate, and the available water capacity is high. The organic-matter content is low. Eel soils are subject to flooding, and runoff is slow. Depth to the seasonal high water table is 3 to 6 feet.

Representative profile of Eel silt loam, in a cultivated field at a point 40 feet north and 1,056 feet west of the southeast corner of the northeast quarter of sec. 12, T. 7 N., R. 8 E.

Ap—0 to 10 inches, brown (10YR 5/3) silt loam; moderate, medium, granular structure; friable; neutral; abrupt, smooth boundary.

A12—10 to 13 inches, brown (10YR 4/3) silt loam; few, fine, faint, pale-brown (10YR 6/3) mottles; weak, fine, granular structure; friable; neutral; clear, smooth boundary.

C1—13 to 24 inches, yellowish-brown (10YR 5/4) loam; common, medium, distinct, pale-brown (10YR 6/3) and light brownish-gray (10YR 6/2) mottles; moderate, medium, granular structure; friable; neutral; clear, smooth boundary.

C2—24 to 44 inches, pale-brown (10YR 6/3) loam; common, medium, distinct, yellowish-brown (10YR 5/6) and light brownish-gray (10YR 6/2) mottles; moderate, medium, granular structure; friable; neutral; clear, smooth boundary.

C3—44 to 60 inches, yellowish-brown (10YR 5/6) stratified loam and fine sandy loam; many, coarse, distinct, light brownish-gray (10YR 6/2) mottles; massive; thin depositional strata; few small pebbles; friable; neutral.

The soil to a depth of about 40 inches ranges from medium acid to neutral. The Ap horizon is dark brown (10YR 4/3) to brown (10YR 5/3). The C1 and C2 horizons have matrix colors ranging from yellowish brown (10YR 5/4) to pale brown (10YR 6/3) and are silt loam to loam. The C2 horizon is neutral to slightly acid below a depth of about 40 inches. The C3 horizon is stratified and ranges from silt loam to fine sand.

In Jennings County, the Eel soils, to a depth of about 40 inches, lack free carbonates. They are slightly more acid than is defined as the range for the series, but this difference does not alter their usefulness and behavior.

Eel soils formed in materials similar to those in which the well-drained Genesee soils formed. They have drainage similar to that of Wilbur soils but have more sand and clay in the C horizon.

Eel silt loam (0 to 2 percent slopes) (Ee).—This soil occupies long, narrow bands on bottom lands. These range from about 5 to 100 acres in size.

Included with this soil in mapping were small areas of nearly level, well drained Genesee soils; nearly level, moderately well drained Wilbur soils; and nearly level, somewhat poorly drained Wakeland soils. Gravelly spots are identified on the detailed soil map by a spot symbol.

Flooding is the major hazard in the use and management of this moderately well drained soil. Because of flooding, absorption of effluent in septic tank absorption fields is periodically restricted.

This soil is suited to corn, soybeans, and small grain. Grasses and legumes for forage can also be grown. During periods of prolonged flooding the small grain and alfalfa are subject to severe damage. Capability unit I–2; woodland suitability group 8.

Elkinsville Series

The Elkinsville series consists of deep, well-drained soils. These soils are nearly level and gently sloping in broad areas of terraces and gently sloping and moderately sloping on short terrace breaks adjacent to bottom lands. They formed in old medium-textured alluvium.

In a representative profile, the surface layer is dark grayish-brown silt loam about 10 inches thick. The subsoil extends to a depth of about 63 inches. In sequence from the top, it is 5 inches of dark yellowish-brown, friable silt loam; 9 inches of strong-brown, friable light silty clay loam; and 39 inches of mottled strong-brown, friable loam. The underlying material, extending to a depth of about 81 inches, is mottled strong-brown sandy loam.

Permeability is moderate, and the available water capacity is high. The organic-matter content is moderate.

Representative profile of Elkinsville silt loam, 2 to 6 percent slopes, eroded, in a cultivated field at a point 20 feet north and 500 feet east of the southwest corner of the southeast quarter of sec. 15, T. 5 N., R. 8 E.

Ap—0 to 10 inches, dark grayish-brown (10YR 4/2) silt loam; moderate, medium, granular structure; friable; plentiful small roots; neutral; abrupt, smooth boundary.

B1—10 to 15 inches, dark yellowish-brown (10YR 4/4) silt loam; weak, medium, subangular blocky structure; friable; plentiful small roots; slightly acid; clear smooth boundary.

B21t—15 to 24 inches, strong-brown (7.5YR 5/6) light silty clay loam; moderate, medium, subangular blocky structure; friable; few small roots; few, discontinuous, thin, dark-brown (7.5YR 4/4) clay films on vertical and horizontal faces of peds; slightly acid; clear, smooth boundary.

IIB22t—24 to 37 inches, strong-brown (7.5YR 5/6) loam; common, fine, distinct, pale-brown (10YR 6/3) mottles; moderate, medium, subangular blocky structure; friable; few small roots; many, discontinuous, thin, dark-brown (7.5YR 4/4) clay films on vertical and horizontal faces of peds; few, small black concretions; very strongly acid; gradual, smooth boundary.

IIB31t—37 to 49 inches, strong-brown (7.5YR 5/6) loam; common, fine, distinct, pale-brown (10YR 6/3) mottles and few, fine, distinct, light brownish-gray (10YR 6/2) mottles; weak, medium, subangular and angular blocky structure; friable; many, discontinuous, thin, dark-brown (7.5YR 4/4) clay films on faces of peds; few, small black concretions; very strongly acid; gradual, smooth boundary.

IIB32t—49 to 63 inches, strong-brown (7.5YR 5/6) loam; common, fine, distinct, pale-brown (10YR 6/3) mottles; weak, medium, subangular and angular blocky structure; friable; few, discontinuous, thin, dark-brown (7.5YR 4/4) clay films on faces of peds and in root channels; few, small, black concretions; few, small, rounded pebbles; very strongly acid; gradual, smooth boundary.

IIC—63 to 81 inches, strong-brown (7.5YR 5/6) sandy loam, many, medium, distinct, pale-brown (10YR 6/3) mottles and few, fine, faint, dark-brown (7.5YR 4/4) mottles; massive; friable; common, small black concretions; few, small, rounded pebbles; very strongly acid.

The solum ranges from about 40 to 72 inches in thickness. The Ap horizon ranges from dark grayish brown (10YR 4/2) to yellowish brown (10YR 5/4. It is strongly acid to neutral, depending on the amount of lime applied. The B2 horizon has matrix colors of dark yellowish brown (10YR 4/4) to strong brown (7.5YR 5/6) and ranges from loam to silty clay loam. The C horizon is stratified and ranges from sandy loam to silty clay loam.

Elkinsville soils are adjacent to moderately well drained Pekin soils. They have less mottling in the upper part of the B horizon than Pekin soils. They have drainage similar to that of Parke soils, but they are less red in the lower part of the B horizon and have less sand and gravel in the C horizon.

Elkinsville silt loam, 0 to 2 percent slopes (ElA).—This soil occupies broad areas on terraces. These areas range from about 5 to 60 acres in size. This soil has the profile described as representative for the series, but it has a thicker surface layer and is slightly deeper to underlying material.

Included with this soil in mapping were small areas of nearly level and gently sloping Pekin soils and areas of gently sloping Elkinsville soils. Also included were small areas of a deep and well-drained soil that has loam or clay loam below the surface layer and is slightly acid to neutral in the lower part.

This soil has no hazards or limitations in use and management.

This soil is suited to corn, soybeans, and small grain. It is also suited to grasses and legumes for forage. This soil is especially suited to alfalfa. Capability unit I–1; woodland suitability group 1.

Elkinsville silt loam, 2 to 6 percent slopes, eroded (ElB2).—This soil occupies broad areas and short breaks on terraces. These areas range from about 5 to 60 acres in size. This soil has the profile described as representative for the series.

Included with this soil in mapping were small areas of gently sloping, eroded Pekin and Parke soils and nearly level Pekin and Elkinsville soils. Also included were small areas of a deep, well-drained soil that is loam or clay loam below the surface layer and is slightly acid or neutral in the lower part. Severely eroded areas less than 3 acres in size are identified on the detailed soil map by a spot symbol.

Runoff and erosion are the major hazards in the use and management of this soil.

This soil is suited to corn, soybeans, and small grain if a suitable system for controlling erosion is established and maintained. Grasses and legumes for forage can also be grown. This soil is especially suited to alfalfa. Capability unit IIe–3; woodland suitability group 1.

Elkinsville silt loam, 6 to 12 percent slopes, eroded (ElC2).—This soil occupies short breaks on terraces. These areas range from about 5 to 20 acres in size. This soil has a profile similar to the one described for the series, but it is shallower to the underlying material.

Included with this soil in mapping were small areas of gently sloping Elkinsville soils and small areas of moderately sloping Parke soils. Also included were small areas of a deep, well-drained soil that is loam or clay below the surface layer and is slightly acid or neutral in the lower part. Severely eroded areas less than 3 acres in size are identified on the detailed soil map by a spot symbol.

Runoff and erosion are the major hazards in the use and management of this soil.

This soil is suited to corn, soybeans, and small grain if a suitable system for controlling erosion is established and maintained. Grasses and legumes for forage can also be grown. This soil is especially suited to alfalfa. Capability unit IIIe-3; woodland suitability group 1.

Fincastle Series

The Fincastle series consists of deep, somewhat poorly drained, nearly level and gently sloping soils on broad upland ridges. These soils formed in loess and the underlying loamy glacial till.

In a representative profile, the surface layer is dark grayish-brown silt loam about 8 inches thick. The subsurface layer is mottled, grayish-brown silt loam about 4 inches thick. The subsoil extends to a depth of about 48 inches. It is mottled, brown, firm silt loam and silty clay loam in the upper 16 inches and mottled, brown, firm and friable clay loam and heavy loam in the lower 20 inches. The underlying material, extending to a depth of about 60 inches, is mottled, brown, yellowish-brown, light brownish-gray, and dark grayish-brown loam.

Permeability is slow, and the available water capacity is high. The organic-matter content is moderate. Depth to the seasonal high water table is about 1 to 3 feet.

Representative profile of Fincastle silt loam, 0 to 3 percent slopes, in a cultivated field at a point 1,000 feet west and 1,000 feet south of the northeast corner of the southwest quarter of sec. 28, T. 8 N., R. 7 E.

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) silt loam; moderate, medium, granular structure; friable; black (10YR 2/1) iron and manganese concretions; neutral; abrupt, smooth boundary.

A2—8 to 12 inches, grayish-brown (10YR 5/2) silt loam; few, fine, distinct, yellowish-brown (10YR 5/6) mottles; weak, thick, platy structure; friable; few fine pores less than 1 millimeter in diameter; black (10YR 2/1) iron and manganese concretions; slightly acid; clear, smooth boundary.

B1t—12 to 15 inches, brown (10YR 5/3) silt loam; common, medium, distinct, grayish-brown (10YR 5/2) and yellowish-brown (10YR 5/6) mottles; weak, medium, subangular blocky structure; firm; discontinuous, dark grayish-brown (10YR 4/2) clay films on faces of peds; strongly acid; clear, smooth boundary.

B21tg—15 to 28 inches, grayish-brown (10YR 5/2) silty clay loam; many, medium, distinct, dark yellowish-brown (10YR 4/4) and brown (10YR 5/3) mottles; moderate, medium, subangular blocky structure; firm; dark grayish-brown (10YR 4/2) clay films on faces of peds; strongly acid; clear, smooth boundary.

IIB22t—28 to 45 inches, brown (10YR 5/3) clay loam; many, medium, distinct, yellowish-brown (10YR 5/4 and 5/6) and grayish-brown (10YR 5/2) mottles; weak, medium and coarse, subangular blocky structure; firm; dark grayish-brown (10YR 4/2) clay films on faces of peds; few till pebbles; strongly acid; clear, smooth boundary.

IIB3—45 to 48 inches, brown (10YR 5/3) heavy loam; many, medium, distinct, gray (10YR 5/1) and yellowish-brown (10YR 5/6) mottles; weak, coarse, subangular blocky structure; friable; very dark grayish-brown (10YR 3/2) clay films mainly on vertical faces of peds; few till pebbles; neutral; clear, wavy boundary.

IIC—48 to 60 inches, mottled brown (10YR 5/3), yellowish-brown (10YR 5/4), light brownish-gray (10YR 6/2), and dark grayish brown (10YR 4/2) loam till; calcareous, mildly alkaline.

The solum ranges from about 40 to 60 inches in thickness. The thickness of loess ranges from about 20 to 40 inches. Depth to carbonates ranges from about 40 to 72 inches. The Ap horizon ranges from dark grayish brown (10YR 4/2) to brown (10YR 5/3), and it is strongly acid to neutral, depending on the amount of lime applied. The A2 horizon has matrix colors of grayish brown (10YR 5/2) or light brownish gray (10YR 6/2). The B2 horizon has matrix colors ranging from grayish brown (10YR 5/2) to yellowish brown (10YR 5/6) and ranges from silty clay loam to clay loam. The B3 horizon has matrix colors ranging from grayish brown (10YR 5/2) to yellowish brown (10YR 5/4), is loam or clay loam, and ranges from medium acid to neutral.

Fincastle soils are adjacent to the very poorly drained Brookston soils and well-drained Russell soils. Fincastle soils have a lighter colored A horizon, and they are less gray in the upper part of the B horizon than the Brookston soils. They have more mottles in the upper part of the B horizon than the Russell soils.

Fincastle silt loam, 0 to 3 percent slopes (FcA).—This soil occupies broad ridges on uplands. These areas range from about 10 to 300 acres in size. This soil has the profile described as representative for the series.

Included with this soil in mapping were small areas of nearly level or slightly depressional, very poorly drained Brookston soils. Also included were small areas of deep, moderately well drained soils and small areas of gently sloping Fincastle and Russell soils.

Wetness is the major limitation in the use and management of this somewhat poorly drained soil. Water stands periodically in some of the low pockets.

This soil is suited to corn, soybeans, and small grain if a suitable drainage system is established and maintained. Grasses and legumes for forage can also be grown. Capability unit IIw-2; woodland suitability group 5.

Fincastle-Russell silt loams, 2 to 6 percent slopes, eroded (FrB2).—This complex consists of Fincastle soils, on lower knolls and ridges and in some of the nearly level areas in between, and Russell soils, on the higher knolls and ridges. These areas range from about 5 to 80 acres in size. The Russell soil has the profile described as representative for the Russell series. About 57 percent of this complex is the somewhat poorly drained Fincastle silt loam, and about 43 percent is the well-drained Russell silt loam.

Included with these soils in mapping were small areas of very poorly drained Brookston soils. Also included were small areas of deep, moderately well drained soils and small areas of Fincastle and Russell soils that have less than 3 inches of surface layer remaining.

Runoff and erosion are the major hazards where these soils are on the higher knolls and ridges. Wetness is the major limitation where these soils are on the lower knolls and ridges and in the low areas between. Water stands periodically in some of the low pockets.

These soils are suited to corn, soybeans, and small grain if a suitable drainage system is established and maintained. Grasses and legumes for forage can also be grown. Capability unit IIe-12; woodland suitability group 5.

Genesee Series

The Genesee series consists of deep, well-drained, nearly level soils in long, narrow areas on bottom lands adjacent to stream channels. These soils formed in recent medium-textured alluvium.

In a representative profile, the surface layer is dark-brown and dark yellowish-brown loam about 12 inches thick. The underlying material extends to a depth of about 60 inches. The upper 24 inches is yellowish-brown friable loam, and below this is dark yellowish-brown heavy sandy loam.

Permeability is moderate, and the available water capacity is high. The organic-matter content is moderate. Genesee soils are subject to flooding, and runoff is slow.

Representative profile of Genesee loam, in a cultivated field at a point 50 feet north and 50 feet west of the southeast corner of the southwest quarter of sec. 20, T. 8 N., R. 7 E.

Ap—0 to 8 inches, dark-brown (10YR 4/3) loam; moderate, medium, granular structure; friable; few worm casts and holes; neutral; abrupt, smooth boundary.

A12—8 to 12 inches, dark yellowish-brown (10YR 4/4) loam; moderate, medium, granular structure; friable; neutral; clear, smooth boundary.

C1—12 to 36 inches, yellowish-brown (10YR 5/6) loam; weak, medium, subangular blocky structure; friable; few brown (10YR 4/3) coatings on faces of peds; slightly acid; clear, smooth boundary.

C2—36 to 60 inches, dark yellowish-brown (10YR 4/4) heavy sandy loam; massive; thin depositional strata; friable; slightly acid.

The soil, to a depth of about 40 inches, ranges from medium acid to neutral. The Ap horizon ranges from dark brown (10YR 3/3) to brown (10YR 5/3). The C horizon ranges from dark brown (10YR 4/3) to yellowish brown (10YR 5/6). The C1 horizon is dominantly loam, but it is stratified with light clay loam to heavy sandy loam in the lower part. The C2 horizon ranges from clay loam to sandy loam, and in some places there is loose sand and gravel below a depth of 4 feet.

In Jennings County, Genesee soils, to a depth of about 40 inches, lack free carbonates. They are slightly more acid than is defined as the range for the series, but this difference does not alter their usefulness and behavior.

Genesee soils formed in materials similar to those in which the moderately well drained Eel soils formed, but they have less mottling in the upper part of the B horizon. Genesee soils have drainage similar to that of Haymond soils, but they are not so acid.

Genesee loam (Ge).—This soil occupies long, narrow areas on bottom lands adjacent to stream channels. Areas of this soil range from about 10 to 150 acres in size.

Included with this soil in mapping were small areas of nearly level, well drained Haymond soils and nearly level, moderately well drained Eel and Wilbur soils. Also included were small areas of Genesee soils that are more acid, are flooded less frequently, and are at about 8 to 10 feet higher elevation than this Genesee soil, which is adjacent to streams. Gravelly spots are identified on the detailed soil map by a spot symbol.

Flooding is the major hazard in the use and management of this soil. Because of flooding, absorption of effluent is periodically restricted in septic tank absorption fields.

This soil is suited to corn, soybeans ,and small grain. Grasses and legumes for forage can also be grown. Small grain and alfalfa are subject to severe damage during periods of prolonged flooding. Capability unit I–2; woodland suitability group 8.

Grayford Series

The Grayford series consists of deep, well-drained soils. These soils of the uplands are gently sloping and moderately sloping on ridges, and they are moderately sloping to moderately steep on hillsides. They formed in a sequence of loess, loamy glacial till, and residuum weathered from underlying limestone bedrock.

In a representative profile, the surface layer is dark yellowish-brown silt loam about 7 inches thick. The subsoil extends to a depth of about 76 inches. In sequence from the top, it is 17 inches of dark yellowish-brown and dark-brown, friable silt loam; 48 inches of strong-brown, dark-brown, and reddish-brown, friable silty clay loam and clay loam; and 4 inches of dark reddish-brown, firm silty clay. The underlying material, to a depth of 79 inches, is dark reddish-brown clay. Limestone bedrock is at a depth below 79 inches.

Permeability is moderate and the available water capacity is high. The organic-matter content is generally moderate but is low in severely eroded areas.

Representative profile of Grayford silt loam, 2 to 6 percent slopes, eroded, in a pasture field at a point 1,000 feet east and 1,000 feet south of the northwest corner of the southwest quarter of sec. 17, T. 7 N., R. 8 E.

Ap—0 to 7 inches, dark yellowish-brown (10YR 4/4) silt loam; common, medium, distinct, dark-brown (7.5YR 4/4) mottles; moderate, fine, granular structure; friable; plentiful fine roots; many worm casts; slightly acid; clear, smooth boundary.

B1—7 to 14 inches, dark yellowish-brown (10YR 3/4) silt loam; moderate, medium, subangular blocky strucblocky structure; friable; plentiful fine roots; many worm casts; slightly acid; clear, smooth boundary.

B21—14 to 24 inches, dark-brown (7.5YR 4/4) heavy silt loam; moderate, medium, subangular blocky structure; friable; few fine roots; many worm casts; few manganese concretions; strongly acid; clear, smooth boundary.

IIB22t—24 to 36 inches, strong-brown (7.5YR 5/6) light silty clay loam (15 to 20 percent is medium sand); moderate, medium, subangular blocky structure; friable; few fine roots; few, discontinuous, thin clay films in pores and on faces of peds; many worm casts; many manganese concretions; many strongly weathered till pebbles; strongly acid; clear, smooth boundary.

IIB23t—36 to 50 inches, dark-brown (7.5YR 4/4) heavy silty clay loam (15 to 20 percent is medium sand); moderate, medium, subangular blocky structure; friable; few fine roots; few, discontinuous, thin clay films in pores and on faces of peds; many strongly weathered till pebbles; strongly acid; clear, smooth boundary.

IIB24t—50 to 66 inches dark-brown (7.5YR 4/4) light silty clay loam (15 to 20 percent sand), that is borderline to clay loam; few, fine, distinct, yellowish-brown (10YR 5/6) mottles; moderate, medium, subangular blocky structure; friable; few, discontinuous, thin clay films in pores and on faces of peds; many strongly weathered till pebbles; strongly acid; clear, smooth boundary.

11B25t—66 to 72 inches, reddish-brown (5YR 4/4) light clay loam; moderate, medium, subangular blocky structure; friable, few, discontinuous, thin clay films in pores and on faces of peds; many iron and

manganese concretions; medium acid; clear, smooth boundary.

IIIB3t—72 to 76 inches, dark reddish-brown (5YR 3/4) silty clay; moderate, medium, subangular blocky structure; firm; few, discontinuous, thin clay films in pores and on faces of peds; many iron and manganese concretions; medium acid; clear, smooth boundary.

IIIC—76 to 79 inches, dark reddish-brown (5YR 3/4) clay; massive; firm, slightly sticky; many iron and manganese concretions; slightly acid; abrupt, smooth boundary.

R—79 inches, limestone bedrock.

The solum ranges from 40 to 96 inches in thickness. The content of clay decreases within a depth of about 60 inches. Thickness of loess ranges from about 20 to 40 inches. Depth of limestone bedrock ranges from about 40 to 96 inches. The Ap horizon ranges from dark brown (10YR 4/3) to yellowish brown (10YR 5/4). It is strongly acid to neutral, depending on the amount of lime applied. The B2 horizon has matrix colors of reddish brown (2.5YR 4/4) to yellowish brown (10YR 5/8). It is silt loam or silty clay loam in the upper part and is silty clay loam or clay loam in the lower part. The C horizon ranges from red (2.5YR 4/6) to dark reddish brown (5YR 3/4) and is silty clay or clay. The C horizon ranges from strongly acid to neutral.

Grayford soils have drainage similar to that of Trappist, Cincinnati, and Parke soils. They are adjacent to moderately deep, well-drained Trappist soils, but they differ from those soils in having a B horizon that formed partly in glacial till. Grayford soils lack the fragipan that Cincinnati and Jennings soils have, and they are redder and more clayey in the B horizons. They have similar drainage and a B horizon similar in color to that of Parke soils. They are more clayey and less friable in the lower part of the B horizon than Parke soils.

Grayford silt loam, 2 to 6 percent slopes, eroded (GfB2).—This soil is on undulating ridges of the uplands. These areas range from about 10 to 150 acres in size. This soil has the profile described as representative for the series.

Included with this soil in mapping were small areas of gently sloping, severely eroded Grayford soils. Also included were moderately sloping, eroded and severely eroded Grayford soils and gently sloping, eroded, well-drained Cincinnati and Parke soils. Severely eroded areas that are less than 3 acres in size and sinkhole areas are identified on the detailed soil map by spot symbols.

Runoff and erosion are the major hazards in the use and management of this soil.

This soil is suited to corn, soybeans, and small grain if a suitable system for controlling erosion is established and maintained. Grasses and legumes for forage can also be grown. This soil is especially suited to alfalfa. Capability unit IIe–3; woodland suitability group 1.

Grayford silt loam, 6 to 12 percent slopes, eroded (GfC2).—This soil is on undulating ridges and hillsides of the uplands. These areas range from about 10 to 150 acres in size.

This soil has a profile similar to the one described as representative for the series, but it has a thinner mantle of loess and is shallower to limestone bedrock.

Included with this soil in mapping were small areas of moderately sloping, severely eroded Grayford soils and moderately sloping, eroded, well-drained Parke soils. Also included were small areas of a soil that has less than 20 inches of loess and is less than 40 inches deep to bedrock. Severely eroded areas that are less than 3 acres in size and sinkhole areas are identified on the detailed soil map by spot symbols.

Runoff and erosion are the major hazards in the use and management of this soil.

This soil is suited to corn, soybeans, and small grain if a suitable system for controlling erosion is established and maintained. Grasses and legumes for pasture can also be grown. This soil is especially suited to alfalfa. Capability unit IIIe–3; woodland suitability group 1.

Grayford silt loam, 6 to 12 percent slopes, severely eroded (GfC3).—This soil is on undulating ridges and hillsides of the uplands. These areas range from about 10 to 60 acres in size. This soil has a profile similar to the one described as representative for the series, but it has a thinner mantle of loess and is shallower to limestone bedrock. Also, the surface layer is less than 3 inches thick and in some places is silty clay loam. It is less friable, has lower organic-matter content and fertility, and is more difficult to keep in good tilth.

Included with this soil in mapping were small areas of moderately sloping, eroded Grayford soils; gently sloping, severely eroded Grayford soils; and strongly sloping, severely eroded Grayford soils. Also included were small areas of moderately sloping, severely eroded, well-drained Parke soils and small areas of a soil that has less than 20 inches of loess and is less than 40 inches deep to bedrock. Areas of sinkholes, rock outcrop, and gullies are identified on the detailed soil map by spot symbols.

Runoff and erosion are the major hazards in the use and management of this soil.

This soil is suited to small grains and to grasses and legumes for pasture if a suitable system for controlling erosion is established and maintained. It is especially suited to alfalfa. The runoff and erosion hazards limits the use of this soil for row crops. Capability unit IVe–3; woodland suitability group 1.

Grayford silt loam, 12 to 18 percent slopes, eroded (GfD2).—This soil is on broad hillsides of the uplands. These areas range from about 10 to 100 acres in size. This soil has a profile similar to the one described as representative for the series, but it has a thinner mantle of loess and is shallower to limestone bedrock.

Included with this soil in mapping were small areas of moderately sloping, eroded Grayford soils and strongly sloping, severely eroded Grayford soils. Also included were small areas of a strongly sloping, eroded, well-drained soil that formed in a thin layer of loess and sandy and gravelly outwash glacial till, and small areas of a soil that has less than 20 inches of loess and is less than 40 inches deep to bedrock. Areas of rock outcrop, sinkholes, escarpments other than bedrock, and severely eroded spots are identified on the detailed soil map by spot symbols.

Runoff and erosion are the major hazards in the use and management of this soil.

This soil is suited to small grain and to grasses and legumes for forage if a suitable system for controlling erosion is established and maintained (fig. 9). This soil is especially suited to alfalfa. The runoff and erosion hazards limits the use of this soil for row crops. Capability unit IVe–3; woodland suitability group 1.

Figure 9.— Pasture of fescue. The soil is Grayford silt loam, 12 to 18 percent slopes, eroded.

Grayford silt loam, 12 to 18 percent slopes, severely eroded (GfD3).—This soil occupies broad hillsides of the uplands. These areas range from about 10 to 60 acres in size. This soil has a profile similar to the one described as representative for the series, but it has a thinner mantle of loess and is shallower to limestone bedrock. Also, the surface layer is less than 3 inches thick and, in some places, is silty clay loam. It is less friable, has lower organic-matter content and fertility, and is more difficult to keep in good tilth.

Included with this soil in mapping were small areas of strongly sloping and moderately steep, eroded Grayford soils. Also included were small areas of a strongly sloping, severely eroded, well-drained soil that formed in a thin layer of loess and sandy and gravelly outwash glacial till and small areas of a soil that has less than 20 inches of loess and is less than 40 inches deep to bedrock. Areas of rock outcrop, sinkholes, escarpments other than bedrock, and gullied spots are identified on the detailed soil map by spot symbols.

Runoff and erosion are the major hazards in the use and management of this soil.

This soil is suited to grasses and legumes for forage if a suitable system for controlling erosion is established and maintained. Some areas are used for woodland. Capability unit VIe–1; woodland suitability group 1.

Grayford-Corydon soils, 18 to 25 percent slopes, eroded (GoE2).—This complex is on hillsides adjacent to natural drainageways of the uplands. These areas range from about 20 to 150 acres in size. Grayford silt loam, 18 to 25 percent slopes, eroded, makes up about 60 percent of this complex, and Corydon stony silt loam, 18 to 25 percent slopes, eroded, makes up about 30 percent. Grayford soil has a profile similar to the one described as representative for the Grayford series, but it has a thinner mantle of loess and depth to limestone bedrock is about 60 inches.

Included with this complex in mapping were small areas of deep, well-drained Grayford and Cincinnati soils that have 12 to 18 percent slopes. Also included were small areas of shallow, well-drained Corydon soils that have slopes of more than 25 percent and small areas of deep, well-drained Hickory soils. Areas of rock outcrop, sinkholes, escarpments other than bedrock, and severely eroded areas that are less than 3 acres in size are identified on the detailed soil map by a spot symbol.

Runoff and erosion are the major hazards in the use and management of these soils.

Because of the moderate steepness and the hazards of runoff and erosion, most areas of this complex are used for woodland. Some areas of these soils are also suited to permanent pasture if a suitable system for controlling erosion is established and maintained. Capability unit VIe–1; woodland suitability group 1.

Gullied Land

Gullied land (Gu) consists of severely gullied areas. These areas range from about 5 to 40 acres in size. The gullies are 3 feet to 8 feet or more in depth, and in

many places they cut into the underlying material. In some places the underlying material is friable glacial till, and in other places it is stratified clay, silt, and fine sand.

In some places limestone or shale bedrock is at a depth of 4 to 6 feet, but it crops out in many of the gullies. Most of the original soil has been destroyed, except on the narrow ridges between the gullies. The soil material that remains is that of Cincinnati, Jennings, Grayford, Elkinsville, Parke, and Trappist soils.

This land is bare of vegetation in most areas, but shrubs, weeds, and wild grasses are starting to grow in a few areas. This land is capable of producing pine trees that are suitable for Christmas trees. To help control further erosion, diversion ditches can be constructed above the gullied areas to intercept water. Capability unit VIIe–1; woodland suitability group 14.

Haymond Series

The Haymond series consists of deep, nearly level, well-drained soils. These soils of the bottom lands are in long, narrow areas adjacent to streams. They formed in recent medium-textured alluvium.

In a representative profile, the surface layer is dark-brown silt loam about 7 inches thick. The underlying material, to a depth of about 38 inches, is dark yellowish-brown, friable silt loam and loam. Below this, extending to a depth of about 72 inches, it is dark-brown silt loam.

Permeability is moderate, and the available water capacity is very high. The organic-matter content is moderate. Haymond soils are subject to flooding, and runoff is slow.

Representative profile of Haymond silt loam, in a cultivated field at a point 500 feet south and 1,250 feet east of the northwest corner of the southwest quarter of sec. 6, T. 5 N., R. 7 E.

Ap—0 to 7 inches, dark-brown (10YR 4/3) silt loam; weak, medium, granular structure; friable; plentiful small roots; neutral; abrupt, smooth boundary.

C1—7 to 28 inches, dark yellowish-brown (10YR 4/4) silt loam; weak; fine and very fine, granular structure; friable; plentiful small roots; medium acid; gradual, smooth boundary.

C2—28 to 38 inches, dark yellowish-brown (10YR 4/4) loam; weak, fine, granular structure; friable; medium acid; gradual, smooth boundary.

C3—38 to 72 inches, dark-brown (10YR 4/3) silt loam; massive; friable; thinly stratified; medium acid; gradual, smooth boundary.

The soil, to a depth of about 40 inches, is medium acid or slightly acid. The Ap horizon ranges from dark grayish brown (10YR 4/2) to brown (10YR 5/3). It is medium acid to neutral, depending on the amount of lime applied. The C1 and C2 horizons have matrix colors of dark brown (10YR 4/3) to yellowish brown (10YR 5/4). Mottles that have a chroma of 2 or less occur below a depth of 24 inches in places. The C3 horizon is silt loam or silt loam stratified with silty clay loam and loam.

Haymond soils formed in materials similar to those of the adjacent moderately well drained Wilbur soils. They either lack mottling or have less mottling than these soils. Haymond soils have drainage similar to that of Genesee soils, but they are more acid.

Haymond silt loam (0 to 2 percent) (Ha).—This soil of the bottom lands occupies long, narrow bands adjacent to streams. The areas range from about 10 to 1,000 acres in size.

Included with this soil in mapping were small areas of nearly level, well-drained Genesee soils and nearly level, moderately well-drained Wilbur soils. Gravelly spots are identified on the detailed soil map by a spot symbol.

Flooding is the major hazard in the use and management of this well-drained soil. Because of the flooding, absorption of effluent is periodically restricted in septic tank absorption fields.

This soil is suited to corn, soybeans, and small grain (fig. 10). Grasses and legumes for forage can also be grown. Small grain and alfalfa are subject to severe damage during periods of prolonged flooding. Capability unit I–2; woodland suitability group 8.

Figure 10. — **In background is corn recently planted in field on Haymond silt loam. In foreground is Kentucky 31 fescue.**

Hickory Series

The Hickory series consists of deep, moderately steep to very steep, well-drained soils. These soils of the uplands are on hillsides adjacent to natural drainageways. They formed in loamy glacial till.

In a representative profile, the surface layer is dark grayish-brown loam about 1 inch thick and the subsurface layer is brown loam about 7 inches thick. The subsoil extends to a depth of about 67 inches. It is yellowish-brown, friable heavy loam in the upper 6 inches and strong-brown and yellowish-brown, firm clay loam in the lower 53 inches. The underlying material, extending to a depth of about 75 inches, is brown loam.

Permeability is moderate, and the available water capacity is high. The organic-matter content is moderate.

Representative profile of Hickory loam, 25 to 50 percent slopes, in a wooded area at a point 1,000 feet north and 1,200 feet east of the southwest corner of the southeast quarter of sec. 15, T. 7 N., R. 9 E.

O1—2½ inches to ½ inch, loose, undecomposed leaves from mixed hardwoods.

O2—½ inch to 0, partly decomposed leaves and roots.

A1—0 to 1 inch, dark grayish-brown (10YR 4/2) loam; moderate, medium, granular structure; very friable; slightly acid; abrupt, smooth boundary.

A2—1 to 8 inches, brown (10YR 5/3) loam; moderate, medium, granular structure; very friable; very strongly acid; clear, smooth boundary.

B1—8 to 14 inches, yellowish-brown (10YR 5/4) heavy loam; weak, medium, subangular blocky structure, friable; few dark-brown (10YR 4/3) organic coatings on faces of peds; few pebbles and chert fragments; very strongly acid; clear, smooth boundary.

B21t—14 to 20 inches, strong-brown (7.5YR 5/6) light clay loam; moderate, medium, subangular blocky structure; firm; common, discontinuous, distinct, thin, yellowish-brown (10YR 5/4) clay films on faces of peds and in pores; few chert fragments and pebbles; very strongly acid; gradual, wavy boundary.

B22t—20 to 32 inches, strong-brown (7.5YR 5/6) clay loam; moderate, medium, subangular and angular blocky structure; firm; many, continuous, distinct, thin, dark-brown (7.5YR 4/4) clay films on faces of peds and in pores; few chert fragments and pebbles; very strongly acid; gradual, wavy boundary.

B23t—32 to 50 inches, yellowish-brown (10YR 5/6) clay loam; moderate, medium, subangular blocky structure; firm; common, discontinuous, distinct, thin, dark yellowish-brown (10YR 4/4) clay films on faces of peds; many continuous, prominent, thin, light yellowish-brown (10YR 6/4) degraded silt coatings on faces of peds; few chert fragments and pebbles; medium acid; gradual, wavy boundary.

B3t—50 to 67 inches, yellowish-brown (10YR 5/4) light clay loam; moderate, coarse, subangular blocky structure; firm; common, discontinuous, distinct, thin, dark yellowish-brown (10YR 4/4) clay films on faces of peds; chert fragments and pebbles make up 10 percent, by volume; slightly acid in upper part and neutral in lower part; gradual, wavy boundary.

C—67 to 75 inches, brown (10YR 5/3) loam; massive; friable; calcareous; moderately alkaline.

The solum ranges from about 42 to 84 inches in thickness. Thickness of loess ranges from about 0 to 20 inches. Depth to carbonates ranges from about 42 to 60 inches or more. The A1 horizon ranges from gray (10YR 5/1) to dark grayish brown (10YR 4/2) and from very strongly acid to slightly acid. The B2 horizon is dark-brown (7.5YR 4/4) to yellowish-brown (10YR 5/6) loam or clay loam. The C horizon ranges from grayish brown (10YR 5/2) to yellowish brown (10YR 5/4) and is loam or clay loam material that weathered from calcareous till.

Hickory soils are adjacent to Cincinnati soils and have similar drainage. They have a thinner mantle of loess than Cincinnati soils, are shallower to carbonates, and lack a fragipan, which Cincinnati soils have. Hickory soils have drainage similar to that of Miami soils, but they are deeper to carbonates and have a thicker solum than those soils.

Hickory loam, 18 to 25 percent slopes, eroded (HkE2).—This soil of the uplands occupies hillsides adjacent to natural drainageways. These areas range from about 20 to 200 acres in size. This soil has a profile similar to the one described as representative for the series, but it is deeper to carbonates.

Included with this soil in mapping were small areas of steep to very steep Hickory soils and strongly sloping, eroded Hickory and Cincinnati soils. Also included were moderately steep, eroded Grayford and Trappist soils on the lower slopes and small areas of well-drained Cincinnati soils on narrow ridges. Escarpments other than bedrock are identified on the detailed soil map by a spot symbol.

Runoff and erosion are the major hazards in the use and management of this well-drained soil.

This soil is used mainly for woodland, for which it is especially suited. It is also suited to permanent pasture if a suitable system for controlling erosion is established and maintained. Capability unit VIe–1; woodland suitability group 2.

Hickory loam, 25 to 50 percent slopes (HkF).—This soil of the uplands occupies hillsides adjacent to natural drainageways. These areas range from about 20 to 200 acres in size. This soil has the profile described as representative for the series.

Included with this soil in mapping were small areas of moderately steep Hickory soils and strongly sloping, eroded Hickory and Cincinnati soils. Also included were steep to very steep Corydon and Weikert soils on the lower slopes and small areas of well-drained Cincinnati soils on narrow ridges. Escarpments other than bedrock are identified on the detailed soil map by a spot symbol.

Runoff and erosion are the major hazards in the use and management of this well-drained soil.

This soil is used mainly for woodland, for which it is especially suited. It is better suited to woodland than to permanent pasture. Capability unit VIIe–1; woodland suitability group 2.

Jennings Series

The Jennings series consists of deep, well-drained soils that have a very firm and brittle fragipan at a depth of 20 to 30 inches (fig. 11). These soils of the uplands are gently sloping and moderately sloping on narrow ridges and breaks and are strongly sloping on hillsides. They formed in a sequence of loess, loamy glacial till, and residuum weathered from underlying black shale.

In a representative profile, the surface layer is dark-brown silt loam about 6 inches thick. The subsoil extends to a depth of about 60 inches. It is yellowish-brown, friable and firm light silty clay loam in the upper 17 inches and is a fragipan of mottled yellowish-brown and light yellowish-brown, very firm and very brittle light clay loam and loam in the lower 37 inches. Weathered black shale is at a depth of 60 inches.

Permeability is very slow in the fragipan. The available water capacity is moderate. Organic-matter content generally is moderate, but it is low where the soils are severely eroded.

Representative profile of Jennings silt loam, 6 to 12 percent slopes, eroded, in a cultivated field at a point 340 feet south and 860 feet west of the northeast corner of the southeast quarter of sec. 23, T. 6 N., R. 8 E.

Ap—0 to 6 inches, dark-brown (10YR 4/3) silt loam; moderate, medium, granular structure; friable; medium acid; abrupt, smooth boundary.

B21t—6 to 12 inches, yellowish-brown (10YR 5/4) light silty clay loam; moderate, medium, subangular blocky structure; friable; discontinuous, thin, yellowish-brown (10YR 5/4) clay films on faces of peds; medium acid, clear, smooth boundary.

B22t—12 to 23 inches, yellowish-brown (10YR 5/4) light silty clay loam; many, medium, faint, yellowish-brown (10YR 5/6) and pale-brown (10YR 6/3) mottles; moderate, medium, subangular and angular blocky structure; firm; discontinuous, thin, brown (7.5YR 5/4) clay films on faces of peds and on linings of voids; light brownish-gray (10YR 6/2) silt coatings on faces of few peds; extremely acid; abrupt, irregular boundary.

IIBx1—23 to 37 inches, yellowish-brown (10YR 5/4 and 5/6) light clay loam; common, medium, distinct, light brownish-gray (10YR 6/2) mottles; strong, coarse, prismatic structure parting to weak, very thick, platy; very firm and brittle; medium, gray

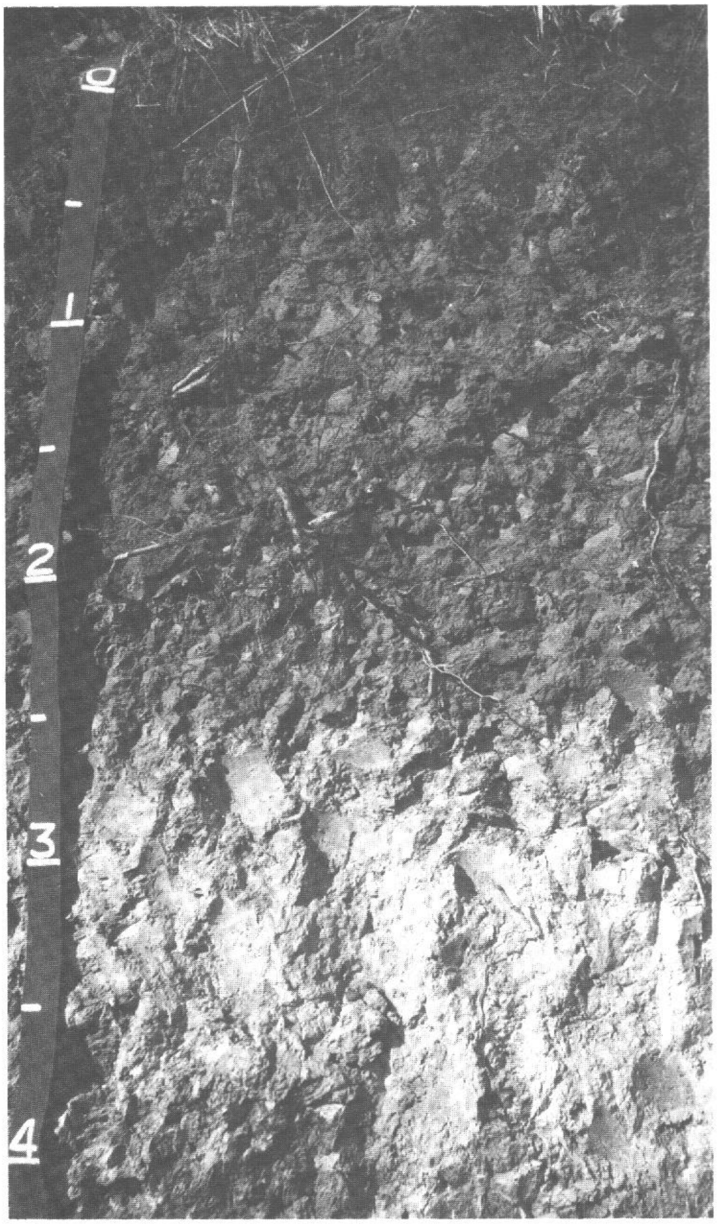

Figure 11. — Profile of Jennings silt loam, 6 to 12 percent slopes, eroded. The light-colored, very firm, brittle fragipan begins at a depth of 30 inches.

(10YR 6/1) and dark-brown (7.5YR 4/4) clay films on faces of peds and in linings of voids; light brownish-gray (10YR 6/2) silt caps on top of prisms and as fillings in old voids; many black and brown concretions; few, fine pebbles; extremely acid; diffuse, wavy boundary.

IIBx2—37 to 50 inches; yellowish-brown (10YR 5/4 and 5/6) loam; common, fine, distinct, light brownish-gray (10YR 6/2) and light yellowish-brown (10YR 6/4) mottles; strong, very coarse, prismatic structure parting to moderate, thick, platy; very firm and very brittle; gray (10YR 6/1) silt coatings on faces of most prisms; thick and thin, gray (10YR 5/1) clay films on faces of platy peds; thin dark-brown (10YR 3/3) clay films on few linings of voids; many concretions; few brown shale fragments; few fine pebbles; extremely acid; diffuse, wavy boundary.

IIBx3—50 to 60 inches, light yellowish-brown (10YR 6/4) loam; common, fine, distinct, light brownish-gray (10YR 6/2) mottles; strong, very coarse, prismatic structure; very firm and very brittle; gray (10YR 6/1) silt coatings on faces of most prisms; few, thick, gray (10YR 5/1) clay films and thin, dark-brown (10YR 3/3) clay films on faces of peds and on linings of voids; many concretions; few black and brown shale fragments; few fine pebbles; very strongly acid; abrupt, wavy boundary.

IIIC—60 inches, weathered black shale.

Thickness of the solum ranges from 48 to 72 inches and is the same as the depth to the bedrock. Thickness of loess ranges from 20 to 40 inches. Depth to the fragipan is 20 to 30 inches. The Ap horizon ranges from dark grayish brown (10YR 4/2) to yellowish brown (10YR 5/4). The B2t horizon ranges from dark yellowish brown (10YR 4/4) to strong brown (7.5YR 5/6) or brown (7.5YR 5/4) and is heavy silt loam or silty clay loam. The Bx horizon has matrix colors ranging from yellowish brown (10YR 5/4 or 5/6) or light yellowish brown (10YR 6/4) to brown (7.5YR 5/4) or strong brown (7.5YR 5/6). This horizon is light silty clay loam to loam or light clay loam.

Jennings soils are adjacent to the well drained Cincinnati soils and the moderately well drained Rossmoyne soils. In contrast to those soils, the lower part of Jennings soils formed in residuum derived from black shale. The Jennings soils are also adjacent to the moderately deep, well-drained Trappist soils. They are less red and less clayey in the B horizon than the Trappist soils, and they have a fragipan, which those soils lack.

Jennings silt loam, 2 to 6 percent slopes, eroded (JnB2).—This well-drained soil occupies narrow ridges and short breaks between nearly level ridges and sloping hillsides on uplands. These areas range from about 10 to 40 acres in size. The profile of this soil is similar to the one described as representative for the series, but it has a thicker mantle of loess, the fragipan is at a greater depth, and it is more strongly developed.

Included with this soil in mapping were small areas of nearly level and gently sloping Cincinnati and Rossmoyne soils, and gently sloping and moderately sloping Trappist soils. Severely eroded areas less than 3 acres in size are identified on the detailed soil map by a spot symbol.

Runoff and erosion are the major hazards, and the very slowly permeable fragipan is the major limitation in the use and management of this soil. The fragipan restricts root growth, the downward movement of water, and the absorption of effluent in septic tank absorption fields.

This soil is suited to corn, soybeans, and small grain if a suitable system for controlling erosion is established and maintained. Grasses and legumes for pasture can also be grown. Capability unit IIe–7; woodland suitability group 9.

Jennings silt loam, 6 to 12 percent slopes, eroded (JnC2).—This well-drained soil occupies narrow ridges and breaks and broad hillsides on uplands. These areas range from about 20 to 100 acres in size. This soil has the profile described as representative for the series.

Included with this soil in mapping were small areas of gently sloping and strongly sloping, eroded Jennings soils. Also included were small areas of Cincinnati, Grayford, and Trappist soils that are moderately sloping, eroded, and well drained. Severely eroded areas less than 3 acres in size are identified on the detailed soil map by a spot symbol.

Runoff and erosion are the major hazards, and the very slowly permeable fragipan is the major limitation in the use and management of this soil. The fragipan restricts root growth, the downward movement of water, and the absorption of effluent in septic tank absorption fields.

This soil is suited to corn, soybeans, and small grain if a suitable erosion control system is established and maintained. Grasses and legumes for forage can also be grown. Capability unit IIIe-7; woodland suitability group 9.

Jennings silt loam, 6 to 12 percent slopes, severely eroded (JnC3).—This soil is on narrow ridges and breaks and on broad hillsides in the uplands. These areas range from about 20 to 100 acres in size. The profile of this soil is similar to that described as representative for the series, but the surface layer is less than 3 inches thick. Also, this layer is less friable, lower in organic-matter content and fertility, and more difficult to keep in good tilth.

Included with this soil in mapping were small areas of moderately sloping, eroded Jennings soils and strongly sloping, severely eroded Jennings soils. Also included were small areas of Cincinnati, Grayford, and Trappist soils that are sloping, severely eroded, and well drained. Gullies and very severely eroded areas are identified on the detailed soil map by spot symbols.

Runoff and erosion are the major hazards in the use and management of this soil. The very slowly permeable fragipan is the main limitation. The fragipan restricts root growth, the downward movement of water, and the absorption of effluent in septic tank absorption fields.

This soil is suited to small grain and to grasses and legumes for forage if a suitable system for controlling erosion is established and maintained. Use of the soil for row crops is limited by the hazard of erosion. Capability unit IVe-7; woodland suitability group 9.

Jennings silt loam, 12 to 18 percent slopes, eroded (JnD2).—This soil occupies narrow ridges and broad hillsides on uplands. These areas range from about 20 to 80 acres in size. The profile of this soil is similar to the one described as representative for the series, but it has a thinner mantle of loess, is shallower to the fragipan, and has a fragipan that is not so well developed.

Included with this soil in mapping were small areas of strongly sloping, severely eroded Jennings soils. Also included were small areas of Cincinnati, Grayford, and Trappist soils that are strongly sloping, eroded, and well drained. Severely eroded areas less than 3 acres in size are identified on the detailed soil map by a spot symbol.

Runoff and erosion are the major hazards, and the very slowly permeable fragipan is the major limitation in the use and management of this soil. The fragipan restricts root growth, the downward movement of water, and the absorption of effluent in septic tank absorption fields.

This soil is suited to small grain and to grasses and legumes for forage if a suitable erosion control system is established and maintained. Runoff and the hazard of erosion limit use of the soil for row crops. Capability unit IVe-7; woodland suitability group 9.

Jennings silt loam, 12 to 18 percent slopes, severely eroded (JnD3).—This soil occupies narrow ridges and broad hillsides on uplands. These areas range from about 10 to 60 acres in size. The profile of this soil is similar to that described as representative of the series, but it has a thinner mantle of loess, is shallower to the fragipan, and has a fragipan that is not so well developed. Also, the surface layer is less than 3 inches thick and is less friable, lower in organic-matter content and fertility, and more difficult to keep in good tilth.

Included with this soil in mapping were small areas of strongly sloping, eroded Jennings soils. Also included were small areas of Cincinnati, Grayford, and Trappist soils that are strongly sloping, severely eroded, and well drained. Gullies and very severely eroded areas are identified on the detailed soil map by spot symbols.

Runoff and erosion are the major hazards in the use and management of this soil. The major limitation is the very slowly permeable fragipan, which restricts root growth, the downward movement of water, and the absorption of effluent in septic tank absorption fields.

This soil is suited to grasses and legumes for forage if a suitable system for controlling erosion is established and maintained. Some areas are used as woodland. Capability unit VIe-1; woodland suitability group 9.

Miami Series

The Miami series consists of deep, moderately sloping and strongly sloping, well-drained soils. These soils of the uplands are on knolls, ridges, and hillsides. They formed in thin loess and the underlying loamy glacial till.

In a representative profile, the surface layer is dark grayish-brown silt loam about 6 inches thick. The subsurface layer is brown silt loam about 2 inches thick. The subsoil extends to a depth of about 38 inches. It is brown, firm heavy silt loam in the upper 6 inches and dark yellowish-brown and yellowish-brown, firm clay loam and loam in the lower 24 inches. The underlying material, extending to a depth of about 60 inches, is brown loam.

Permeability is moderate, and the available water capacity is high. The organic-matter content is moderate in most areas, but it is low in severely eroded areas.

Representative profile of Miami silt loam, 6 to 12 percent slopes, eroded, in a cultivated field at a point 200 feet east and 400 feet south of the northwest corner of sec. 26, T. 8 N., R. 7 E.

Ap—0 to 6 inches, dark grayish-brown (10YR 4/2) silt loam; moderate, fine, granular structure; friable; neutral; abrupt, smooth boundary.

A2—6 to 8 inches, brown (10YR 5/3) silt loam; weak, thin, platy structure; friable; strongly acid; clear, smooth boundary.

B1—8 to 14 inches, brown (10YR 5/3) heavy silt loam; moderate, fine, subangular blocky structure; firm; few, patchy, dark yellowish-brown (10YR 4/4) clay films on faces of peds; strongly acid; clear, smooth boundary.

IIB21t—14 to 24 inches, dark yellowish-brown (10YR 4/4) clay loam; moderate, medium, subangular blocky structure; firm; many dark-brown (7.5YR 4/4) and dark yellowish-brown (10YR 4/4) clay films

on faces of peds; many, continuous prominent, medium, brown (10YR 5/3) silt coatings on faces of peds; few iron and manganese concretions; strongly acid; clear, wavy boundary.

IIB22t—24 to 32 inches, yellowish-brown (10YR 5/4) heavy clay loam; moderate, medium and coarse, subangular blocky structure; firm; dark yellowish-brown (10YR 3/4) clay films on faces of peds; strongly acid; clear, wavy boundary.

IIB3—32 to 38 inches, yellowish-brown (10YR 5/4) loam; weak, very coarse, subangular blocky structure; firm; dark-brown (10YR 3/3) clay material fills voids; slightly acid; clear, wavy boundary.

IIC—38 to 60 inches, brown (10YR 5/3) loam; massive; friable; calcareous till; moderately alkaline.

The solum ranges from about 24 to 42 inches in thickness. Thickness of loess ranges from about 10 to 18 inches. Depth of carbonates ranges from about 20 to 42 inches. The Ap horizon ranges from dark grayish brown (10YR 4/2) to brown (10YR 5/3). It is strongly acid to neutral depending on the amount of lime applied. Some profiles have an A2 horizon of brown (10YR 5/3) or yellowish-brown (10YR 5/4) silt loam that is about 2 to 6 inches thick. Some profiles have a B1 horizon of loam or silt loam about 1 to 6 inches thick. The B2 horizon ranges from dark yellowish brown (10YR 4/4) or yellowish brown (10YR 5/4) to brown (7.5YR 4/4) and is silty clay loam or clay loam. The C horizon is loam or light clay loam.

Miami soils are adjacent to the somewhat poorly drained Fincastle soils, but they formed in a thinner mantle of loess. They have a thinner solum and are shallower to carbonates than Fincastle soils. Miami soils have drainage similar to that of Hickory soils, but they have a thinner solum and are shallower to carbonates.

Miami silt loam, 6 to 12 percent slopes, eroded (MmC2).—This soil of the uplands occupies knolls, ridges, and hillsides. These areas range from about 5 to 20 acres in size. This soil has the profile described as representative for the series.

Included with this soil in mapping were small areas of moderately sloping, severely eroded Miami and Russell soils; gently sloping, eroded Miami, Russell, and Grayford soils; and strongly sloping, eroded Miami soils. Severely eroded areas that are less than 3 acres in size are identified on the detailed soil map by a spot symbol. In some severely eroded areas there are exposed spots of calcareous till on the surface.

Runoff and erosion are the major hazards in the use and management of this well-drained soil.

This soil is suited to corn, soybeans, and small grain if a suitable system for controlling erosion is established and maintained. Grasses and legumes for forage can also be grown. This soil is especially suited for alfalfa. Capability unit IIIe–1; woodland suitability group 1.

Miami silt loam, 12 to 18 percent slopes, eroded (MmD2).—This soil of the uplands occupies broad hillsides. These areas range from about 10 to 60 acres in size. This soil has a profile similar to the one described as representative for the series, but it has a thinner mantle of loess and is shallower to the underlying glacial till.

Included with this soil in mapping were small areas of moderately sloping, eroded Miami soils and strongly sloping, severely eroded Miami soils. Also included were small areas of moderately steep, well-drained Hickory soils. In some severely eroded areas there are exposed spots of calcareous till on the surface. Severely eroded spots and escarpments other than bedrock are identified on the detailed soil map by spot symbols.

Runoff and erosion are the major hazards in the use and management of this well-drained soil.

This soil is suited to small grain and to grasses and legumes for forage if a suitable system for controlling erosion is established and maintained. This soil is especially suited to alfalfa. Capability unit IVe–1; woodland suitability group 1.

Miami clay loam, 6 to 12 percent slopes, severely eroded (MoC3).—This soil of the uplands occupies knolls, ridges, and hillsides. These areas range from about 5 to 30 acres in size. This soil has a profile similar to the one described as representative for the series, but it has a thinner mantle of loess and is shallower to underlying glacial till. Also, the surface layer is clay loam less than 3 inches thick. The surface layer is less friable, has lower organic-matter content and fertility, and is more difficult to keep in good tilth.

Included with this soil in mapping were small areas of moderately sloping, eroded Miami and Russell soils and gently sloping, severely eroded Miami and Russell soils; and strongly sloping, severely eroded Miami soils. In some areas there are exposed spots of calcareous till on the surface.

Runoff and erosion are the major hazards in the use and management of this soil. If this soil is wet when it is plowed, it becomes cloddy; the clods are difficult to break down.

This soil is suited to small grain and to grasses and legumes for forage if a suitable system for controlling erosion is established and maintained. This soil is especially suited to alfalfa. Runoff and the hazard of erosion limit the use of this soil for row crops. Capability unit IVe–1; woodland suitability group 1.

Parke Series

The Parke series consists of deep, well-drained soils. These soils of the outwash plains between bottom lands and uplands are gently sloping and moderately sloping on broad ridges and moderately sloping on hillsides. They formed in loess and loamy glacial outwash or till and are underlain by sand and gravel.

In a representative profile, the surface layer is dark grayish-brown silt loam about 7 inches thick. The subsurface layer is dark-brown silt loam about 4 inches thick. The subsoil extends to a depth of about 70 inches. In sequence from the top, it is 15 inches of dark-brown and strong-brown, friable silty clay loam; 24 inches of dark-brown, firm and friable clay loam; and 20 inches of strong-brown and yellowish-red, very friable sandy clay loam.

Permeability is moderate, and the available water capacity is high. The organic-matter content is generally moderate, but it is low in the severely eroded areas.

Representative profile of Parke silt loam, 2 to 6 percent slopes, eroded, in a wooded area at a point 600 feet south and 1,200 feet west of the northeast corner of sec 26, T. 7 N., R. 8 E.

O1—1 inch to 0, loose, undecayed pine needles.

Ap—0 to 7 inches, dark grayish-brown (10YR 4/2) silt loam; moderate, medium, granular structure; friable; plentiful roots; medium acid; clear, wavy boundary.

A2—7 to 11 inches, dark-brown (10YR 4/3) silt loam; moderate, medium, granular structure; friable; plentiful roots; medium acid; clear, wavy boundary.

B1t—11 to 15 inches, dark-brown (7.5YR 4/4) light silty clay loam; weak, medium, subangular blocky structure; friable; few roots; few discontinuous, distinct, thin, reddish-brown (5YR 4/4) clay films on faces of peds; medium acid; gradual, wavy boundary.

B21t—15 to 26 inches, strong-brown (7.5YR 5/6) silty clay loam; moderate, medium, subangular blocky structure; friable; few roots; common, discontinuous, distinct, thin, reddish-brown (5YR 4/4) clay films on faces of peds; strongly acid; clear, wavy boundary.

IIB22tb—26 to 35 inches, dark-brown (7.5YR 4/4) clay loam; moderate, medium, subangular blocky structure; firm; very few roots; common, discontinuous, distinct, thin, reddish-brown (5YR 5/4) clay films on faces of peds; few pebbles; strongly acid; clear, smooth boundary.

IIB23tb—35 to 50 inches, dark-brown (7.5YR 4/4) light clay loam; weak, medium, subangular blocky structure; friable; very few roots; few, patchy, faint, thin reddish-brown (5YR 4/4) clay films on faces of peds; few black concretions; few pebbles; very strongly acid; gradual, wavy boundary.

IIB31b—50 to 64 inches, strong-brown (7.5YR 5/6) sandy clay loam; weak, medium, subangular blocky structure; very friable; few, patchy, faint, thin, reddish-brown (5YR 4/4) clay films on linings of voids; few pebbles; very strongly acid; gradual, wavy boundary.

IIB32b—64 to 70 inches, yellowish-red (5YR 4/6) sandy clay loam; massive; very friable; few pebbles; very strongly acid.

The solum ranges from 48 to 84 inches in thickness. Thickness of loess ranges from 20 to 40 inches. Calcareous sand and gravel is at a depth of about 10 to 12 feet in some places but is lacking in others. The Ap horizon ranges from dark grayish brown (10YR 4/2) to dark yellowish brown (10YR 4/4). It is strongly acid to neutral, depending on the amount of lime applied. The B2 horizon ranges from dark brown (7.5YR 4/4) to yellowish brown (10YR 5/6) and is heavy silt loam or silty clay loam in the upper part, and it ranges from red (2.5YR 4/6) to dark brown (7.5YR 4/4) and is clay loam or sandy clay loam in the lower part. The B3 horizon is sandy clay loam or sandy loam, and its content of clay diminishes gradually as depth increases.

Parke soils have drainage similar to that of Elkinsville soils, but the lower part of their B horizon is redder and their C horizon has more sand and gravel. They have drainage similar to that of Grayford soils, and their B horizon has similar color. Parke soils are also less clayey and more friable in the lower part of the B horizon than Grayford soils.

Parke silt loam, 2 to 6 percent slopes, eroded (PaB2).—This soil of the outwash plains between bottom lands or terraces and uplands is on broad undulating ridges. These areas range from about 10 to 60 acres in size. This soil has the profile described as representative for the series.

Included with this soil in mapping were small areas of gently sloping, severely eroded Parke soils and nearly level Parke soils. Also included were moderately sloping, eroded, and severely eroded Parke soils and gently sloping, eroded, well-drained Cincinnati and Grayford soils. Severely eroded areas that are less than 3 acres in size and sinkhole areas are identified on the detailed soil map by spot symbols.

Runoff and erosion are the major hazards in the use and management of this well-drained soil.

This soil is suited to corn, soybeans, and small grain if a suitable system for controlling erosion is established and maintained. Grasses and legumes for pasture can also be grown. This soil is especially suited to alfalfa. Capability unit IIe–1; woodland suitability group 1.

Parke silt loam, 6 to 12 percent slopes, eroded (PaC2).—This soil of the outwash plains between bottom lands or terraces and uplands is on undulating ridges and hillsides. These areas range from about 10 to 60 acres in size. This soil has a profile similar to the one described as representative for the series, but it has a thinner mantle of loess.

Included with this soil in mapping were small areas of moderately sloping, severely eroded Parke soils; small areas of moderately sloping, eroded, well-drained Grayford soils; and small areas of a strongly sloping soil that has less than 20 inches of loess and is underlain by sand and gravel. Severely eroded areas that are less than 3 acres in size and sinkholes are identified on the detailed soil map by spot symbols.

Runoff and erosion are the major hazards in the use and management of this well-drained soil.

This soil is suited to corn, soybeans, and small grain if a suitable system for controlling erosion is established and maintained. Grasses and legumes for forage can also be grown. This soil is especially suited to alfalfa. Capability unit IIIe–1; woodland suitability group 1.

Parke silt loam, 6 to 12 percent slopes, severely eroded (PaC3).—This soil of the outwash plains between bottom lands, or terraces, and uplands is on broad undulating ridges and hillsides. These areas range from about 12 to 40 acres in size. This soil has a profile similar to the one described as representative for the series, but it has a thinner mantle of loess and is shallower to underlying sand and gravel. Also, the surface layer is less than 3 inches thick and is silty clay loam in some places. The surface is less friable, is lower in organic-matter content and fertility, and is more difficult to keep in good tilth.

Included with this soil in mapping were small areas of moderately sloping, eroded Parke soils; gently sloping, severely eroded Parke soils; and strongly sloping, severely eroded Parke soils. Also included were small areas of strongly sloping, well-drained Grayford soils and small areas of a soil that has less than 20 inches of loess and is underlain by sand and gravel. Gullies and areas of sinkholes are identified on the detailed soil map by spot symbols.

Runoff and erosion are the major hazards in the use and management of this well-drained soil.

This soil is suited to small grains and to grasses and legumes for forage if a suitable system for controlling erosion is established and maintained. This soil is especially suited to alfalfa. The hazards of runoff and erosion limit the use of this soil for row crops. Capability unit IVe–1; woodland suitability group 1.

Pekin Series

The Pekin series consists of deep, moderately well-drained soils that have a very firm and brittle fragipan beginning at a depth of about 20 inches to 36 inches. These soils of the terraces are nearly level in broad areas and gently sloping and moderately sloping on short breaks. They formed in old medium-textured alluvium.

In a representative profile, the surface layer is brown silt loam about 7 inches thick. The subsoil extends to a depth of about 47 inches. It is mottled yellowish-brown, friable silt loam in the upper 17 inches and mottled yellowish-brown and light brownish-gray, very firm and brittle fragipan of silt loam and light silty clay loam in the lower 23 inches. The underlying material, extending to a depth of about 72 inches, is mottled yellowish-brown, grayish-brown, and light brownish-gray silty clay loam that, in the lower part, is stratified with silt loam and loam.

Permeability is very slow in the fragipan, and the available water capacity is moderate. The organic-matter content is low. Depth to the seasonal high water table is about 3 to 6 feet.

Representative profile of Pekin silt loam, 2 to 6 percent slopes, eroded, in a cultivated field at a point 200 feet east and 600 feet north of the southwest corner of the northeast quarter of sec. 2, T. 6 N., A. 7 E.

Ap—0 to 7 inches, brown (10YR 5/3) silt loam; moderate, fine, granular structure; friable; a few small roots; few small pebbles; strongly acid; abrupt, smooth boundary.

B1—7 to 11 inches, yellowish-brown (10YR 5/4) silt loam; weak, medium, subangular blocky structure; friable; few small roots; few small pebbles; strongly acid; abrupt, smooth boundary.

B2t—11 to 24 inches, yellowish-brown (10YR 5/6) heavy silt loam; few, fine, distinct mottles of light brownish gray (10YR 6/2); moderate, medium, subangular blocky structure; friable; few, discontinuous, thin, yellowish-brown (10YR 5/8) clay films on faces of peds and in a few voids and cracks; few small pebbles; strongly acid; clear, smooth boundary.

Bx1—24 to 35 inches, yellowish-brown (10YR 3/4) silt loam; many, fine, distinct mottles of light brownish gray (10YR 6/2); weak, very coarse, prismatic structure parting to weak and moderate, medium, subangular and angular blocky; very firm and brittle; few, discontinuous, thin, yellowish-brown (10YR 5/6) clay films on faces of peds and in a few voids and cracks; few, thin, light-gray (10YR 7/1) silt coatings on faces of prisms and as cappings; few, black (10YR 2/1) soft iron and manganese concretions; strongly acid; gradual, wavy boundary.

Bx2g—35 to 47 inches, light brownish-gray (10YR 6/2) light silty clay loam; many, fine and medium, distinct mottles of yellowish-brown (10YR 5/6); weak, very coarse, prismatic structure parting to weak and moderate, medium, subangular and angular blocky; very firm and brittle; thin, light-gray (10YR 7/1) silt cappings on prisms in upper part of horizon; few, black, soft iron and manganese concretions; strongly acid; gradual, wavy boundary.

C—47 to 72 inches, mottled yellowish-brown (10YR 5/6 and 5/4), grayish-brown (10YR 5/2), and light brownish-gray (10YR 6/2) silty clay loam, stratified in lower part with silt loam and loam; massive; friable; many soft iron and manganese concretions; strongly acid.

The solum ranges from about 40 to 60 inches in thickness. Depth to the fragipan ranges from about 20 to 36 inches. The Ap horizon ranges from dark grayish brown (10YR 4/2) to yellowish brown (10YR 5/4). It is strongly acid to neutral depending on the amount of lime applied. Between the base of the Ap horizon and the top of the Bx horizon, the matrix colors range from brown (10YR 5/3) to yellowish brown (10YR 5/6) or light yellowish brown (10YR 6/4), and the texture is silt loam or silty clay loam. The Bx horizon has matrix colors of brown (10YR 5/3) or yellowish brown (10YR 5/6) to light brownish gray (10YR 6/2), and it is strongly acid or very strongly acid silt loam or silty clay loam. The C horizon consists of stratified silt loam, loam, and silty clay loam.

Pekin soils are adjacent to somewhat poorly drained Bartle soils, but they have less gray mottling in the upper part of their subsoil. Pekin soils have drainage similar to that of Rossmoyne soils, but they formed in old medium-textured alluvium whereas Rossmoyne soils formed in loess and loamy glacial till.

Pekin silt loam, 0 to 2 percent slopes (PcA).—This soil is in broad areas on terraces. These areas range from about 10 to 40 acres in size. This soil has a profile similar to the one described as representative for the series, but the surface layer is thicker and depth to the fragipan is greater.

Included with this soil in mapping were small areas of nearly level and gently sloping Elkinsville and Bartle soils.

Wetness and the very slowly permeable fragipan are the major limitations in the use and management of this moderately well-drained soil. The fragipan restricts the penetration of roots, the downward movement of water, and the absorption of effluent in septic tank absorption fields.

This soil is suited to corn, soybeans, and small grain if a suitable drainage system is established and maintained. Grasses and legumes for forage can also be grown. Capability unit IIw-5; woodland suitability group 9.

Pekin silt loam, 2 to 6 percent slopes, eroded (PcB2).—This soil is on short breaks on terraces. These areas range from about 10 to 40 acres in size. This soil has the profile described as representative for the series.

Included with this soil in mapping were small areas of nearly level Bartle and Pekin soils, and small areas of gently sloping and moderately sloping Elkinsville soils. Severely eroded areas that are less than 3 acres in size are identified on the detailed soil map by a spot symbol.

Runoff and erosion are the major hazards, and the very slowly permeable fragipan is the major limitation in the use and management of this moderately well drained soil. The fragipan restricts the penetration of roots, the downward movement of water, and the absorption of effluent in septic tank absorption fields.

This soil is suited to corn, soybeans, and small grain if a suitable system for controlling erosion is established and maintained. Grass and legumes for forage can also be grown. Capability unit IIe-7; woodland suitability group 9.

Pekin silt loam, 6 to 10 percent slopes, eroded (PcC2).—This soil is on short breaks on terraces. These areas range from about 5 to 30 acres in size. This soil has a profile similar to the one described as representative for the series, but the fragipan is not so deep or so well developed.

Included with this soil in mapping were small areas of gently sloping Pekin soils and moderately sloping Elkinsville soils. Also included were small areas of a moderately sloping, deep, well-drained soil that has a fragipan. Severely eroded areas that are less than 3 acres in size are identified on the detailed soil map by spot symbols.

Runoff and erosion are the major hazards, and the very slowly permeable fragipan is the major limitation in the use and management of this moderately well drained soil. The fragipan restricts the penetration of roots, the downward movement of water, and the absorption of effluent in septic tank absorption fields.

This soil is suited to corn, soybeans, and small grain if a suitable system for controlling erosion is established and maintained. Grass and legumes for forage can also be grown. Capability unit IIIe–7; woodland suitability group 9.

Peoga Series

The Peoga series consists of deep, poorly drained, nearly level soils in broad areas of terraces adjacent to uplands. They formed in old medium-textured alluvium.

In a representative profile the surface layer is mottled grayish-brown and gray silt loam about 10 inches thick. The subsurface layer is mottled gray silt loam about 5 inches thick. The subsoil extends to a depth of about 72 inches. In sequence from the top, it is 10 inches of mottled, gray, friable heavy silt loam; 27 inches of mottled, gray, firm and brittle silty clay loam; and 20 inches of mottled yellowish-brown and gray, friable silt loam.

Permeability is slow, and the available water capacity is moderate. The organic-matter content is low. Runoff is slow. Depth to the seasonal high water table is 0 to 1 foot.

Representative profile of Peoga silt loam, in a wooded area at a point 50 feet east and 1,200 feet north of the southwest corner of sec. 33, T. 5 N., R. 7 E.

A1g—0 to ½ inch, grayish-brown (10YR 5/2) silt loam; moderate, fine, granular structure; friable; neutral; abrupt, smooth boundary.

Apg—½ inch to 10 inches, gray (5Y 6/1) silt loam; common, medium, distinct, yellowish-brown (10YR 5/6) mottles; moderate, medium, granular structure; friable; strongly acid; abrupt, smooth boundary.

A2g—10 to 15 inches, gray (5Y 6/1) silt loam; many, coarse, distinct, yellowish-brown (10YR 5/4 and 5/6) mottles; weak, thick, platy structure; friable; very strongly acid; clear, irregular boundary.

B1g—15 to 25 inches, gray (5Y 6/1) heavy silt loam; many, coarse, distinct yellowish-brown (10YR 5/4 and 5/6) mottles; weak, medium, prismatic structure; friable; many, continuous, prominent, thick, gray (5Y 6/1) silt coatings on faces of prisms; very strongly acid; clear, irregular boundary.

Bx1g—25 to 42 inches, gray (10YR 6/1) light silty clay loam; many, coarse, distinct, yellowish-brown (10YR 5/4 and 5/6) mottles; moderate, coarse, prismatic structure; firm and brittle, in 40 to 50 percent, by volume, of the horizon; many flattened roots on faces of peds, very few fine roots on inside of peds; common, discontinuous, prominent, medium, gray (5YR 5/1) clay films on faces of peds; continuous, prominent, gray (5Y 6/1) silt coatings on faces of many peds; very strongly acid; clear, irregular boundary.

Bx2g—42 to 52 inches, gray (10YR 6/1) silty clay loam; many, coarse, prominent, yellowish-brown (10YR 5/4 and 5/8) mottles; moderate, coarse, prismatic structure; firm and brittle, in 40 to 50 percent, by volume, of the horizon; many flattened roots on faces of peds; common, discontinuous, prominent, medium, gray (5Y 5/1) clay films on faces of peds; many continuous, prominent, gray (5Y 6/1) silt coatings on faces of peds; medium acid; clear, irregular boundary.

B3—52 to 72 inches, mottled yellowish-brown (10YR 5/6) and gray (10YR 6/1) silt loam that has a high proportion of sand; massive; friable; slightly acid.

The solum ranges from about 48 to 72 inches in thickness. The Ap horizon ranges from dark grayish brown (10YR 4/2) to gray (5Y 6/1). It is strongly acid to neutral, depending on the amount of lime applied. The Bx horizon has matrix colors ranging from gray (10YR 5/1) to light gray (10YR 7/1), ranges from very strongly acid to medium acid, and is silt loam or silty clay loam. The B3 horizon has matrix colors ranging from yellowish brown (10YR 5/4) to gray (10YR 6/1), ranges from strongly acid to slightly acid, and is loam, silt loam, or silty clay loam.

Peoga soils are adjacent to the somewhat poorly drained Bartle soils. They are grayer in the upper part of the B horizon and lack a fragipan, which Bartle soils have. Peoga soils have drainage similar to that of Bonnie soils but have a more clayey B horizon. They formed in old medium-textured alluvium, but Bonnie soils formed in recent medium-textured alluvium.

Peoga silt loam (Pe).—This soil occupies broad terraces adjacent to uplands. These areas range from about 5 to 30 acres in size.

Included with this soil in mapping were small areas of nearly level, somewhat poorly drained Bartle soils. Wet spots that are 2 acres or less in size are identified on the detailed soil map by a spot symbol.

Wetness and the slow permeability are the major limitations in the use and management of this poorly drained soil. The slowly permeable layer restricts the downward movement of water and the absorption of effluent in septic tank absorption fields.

This soil is suited to corn and soybeans if a suitable drainage system is established and maintained. It is also suited to grasses and legumes for forage. Capability unit IIIw–12; woodland suitability group 11.

Rossmoyne Series

The Rossmoyne series consists of deep, moderately well drained soils that have a very firm and brittle fragipan beginning at a depth of about 20 to 30 inches. These soils of the uplands are nearly level and gently sloping on narrow ridges and gently sloping on short breaks. They formed in loess and the underlying loamy glacial till.

In a representative profile, the surface layer is grayish-brown silt loam about 8 inches thick. The subsurface layer is light yellowish-brown silt loam about 4 inches thick. The subsoil extends to a depth of about 80 inches. In sequence from top, it is 18 inches of mottled yellowish-brown, friable and firm heavy silt loam; 30 inches of yellowish-brown and brownish-yellow, very firm and firm, very brittle and brittle loam fragipan; and 20 inches of mottled brownish-yellow and yellowish-brown, firm loam and light clay loam.

Permeability is very slow in the fragipan, and the available water capacity is moderate. The organic-matter content is low. Depth to the water table is 3 to 6 feet.

Representative profile of Rossmoyne silt loam, 2 to 6 percent slopes, eroded; in an idle field at a point 240 feet west and 400 feet north of the southeast corner of the northeast quarter of sec. 27, T. 6 N., R. 8 E.

Ap—0 to 8 inches, grayish-brown (10YR 5/2) silt loam; moderate, medium, granular structure; friable; plentiful roots; neutral; abrupt, smooth boundary.

A2—8 to 12 inches, light yellowish-brown (10YR 6/4) silt loam; weak, thick, platy structure; friable; common roots; thin, very pale brown (10YR 7/3) silt coatings on common ped faces; neutral; abrupt, wavy boundary.

B1—12 to 22 inches, yellowish-brown (10YR 5/4) heavy silt loam; few, fine, distinct, light brownish-gray (10YR 6/2) mottles; weak, medium, subangular blocky structure; friable; few roots; few, patchy, distinct, thin, yellowish-brown (10YR 5/6) clay films on faces of peds; common, discontinuous, distinct, thin, light brownish-gray (10YR 6/2) silt coatings on faces of peds and in old root channels; very strongly acid; clear, wavy boundary.

IIB2t—22 to 30 inches, yellowish-brown (10YR 5/6) heavy silt loam; common, medium, distinct, light brownish-gray (10YR 6/2) mottles; weak, coarse, prismatic structure parting to moderate, medium, subangular blocky; firm; few roots; common, discontinuous, distinct, thin, light brownish-gray (10YR 6/2) silt coatings on faces of prisms and on linings of pores; common, discontinuous, distinct, medium and thin, brown (10YR 5/3), yellowish-brown (10YR 4/4), and strong-brown (7.5YR 5/6) clay films on faces of peds and on linings of pores; few iron and manganese concretions; few pebbles; very strongly acid; clear, irregular boundary.

IIBx1—30 to 49 inches, yellowish-brown (10YR 5/4) loam; strong, very coarse, prismatic structure parting to weak, thick, platy; very firm, very brittle; many, continuous, prominent, medium and thick, grayish-brown (10YR 5/2) clay films on faces of prisms; few, patchy, distinct, thin, dark-brown (7.5YR 4/4) clay films on linings of voids and on platy faces; common, discontinuous, distinct, thin, light-gray (10YR 7/1) silt coatings on vertical faces; common iron and manganese concretions; few pebbles; very strongly acid; gradual, wavy boundary.

IIBx2—49 to 60 inches, brownish-yellow (10YR 6/6) loam; weak, very coarse, prismatic structure; massive within prisms; firm and brittle; few, patchy, distinct, thin, yellowish-brown (10YR 5/6) and gray (10YR 5/1) clay films on faces of peds; common, discontinuous, prominent, thick, gray (10YR 6/1) silt streaks on faces of prisms and throughout matrix; few pebbles; very strongly acid; clear, wavy boundary.

IIB31—60 to 70 inches, brownish-yellow (10YR 6/6) loam; many, medium, distinct, yellowish-red (5YR 5/6) and light brownish-gray (10YR 6/2) mottles; weak, very coarse, prismatic structure parting to weak, thick, platy; firm and brittle; few, patchy, distinct, thin, grayish-brown (10YR 5/2) and yellowish-brown (10YR 5/6) clay films on faces of peds and in linings of a few voids; light brownish gray (10YR 6/2) silt streaks; few pebbles; medium acid; clear, wavy boundary.

IIB32—70 to 80 inches, yellowish brown (10YR 5/6) light clay loam; weak, very coarse, prismatic structure; firm; common, discontinuous, distinct, thin, strong-brown (7.5YR 5/6) and brown (10YR 5/3) clay films on faces of peds and in some voids; pockets of black (10YR 2/1) iron and manganese concretions; 10 percent, by volume, of fine till pebbles; neutral.

The solum ranges from about 60 to 120 inches in thickness. Thickness of loess ranges from about 18 to 40 inches. Depth to the fragipan ranges from about 20 to 30 inches. The Ap horizon is dark grayish brown (10YR 4/2) to light yellowish brown (10YR 6/4). It is strongly acid to neutral, depending on the amount of lime applied. Between the base of the Ap horizon and the top of the Bx horizon, matrix colors range from brown (10YR 5/3) to yellowish brown (10YR 5/6), and the texture is silt loam or light silty clay loam. Reaction ranges from medium acid to very strongly acid. The Bx horizon has matrix colors of gray (10YR 5/1) to brownish yellow (10YR 6/6), and it is silt loam to loam or clay loam. This horizon is strongly or very strongly acid. The B3 horizon has matrix colors ranging from yellowish brown (10YR 5/6) or brownish yellow (10YR 6/6) to light olive brown (2.5YR 5/4). It ranges from strongly acid to neutral and is loam or clay loam.

Rossmoyne soils are adjacent to the somewhat poorly drained Avonburg and well drained Cincinnati soils, and they formed in similar material. In the upper part of the B horizon they have less gray mottling than the Avonburg soils and more gray mottling than the Cincinnati soils. Rossmoyne soils have drainage similar to that of Pekin soils. They formed in loess and loamy glacial till, but Pekin soils formed in old medium-textured alluvium.

Rossmoyne silt loam, 0 to 2 percent slopes (RsA).—This soil is on narrow ridges of the uplands. The areas range from about 5 to 40 acres in size. This soil has a profile similar to the one described as representative for the series, but the surface layer is thicker, and it is deeper to a fragipan, which is not so well developed.

Included with this soil in mapping were small areas of nearly level and gently sloping Avonburg soils and small areas of well-drained Cincinnati soils. Also included were small areas of a deep, moderately well drained soil underlain by sand and gravel from glacial outwash.

Wetness and the very slowly permeable fragipan are the major limitations in the use and management of this moderately well drained soil. The fragipan restricts the penetration of roots, the downward movement of water, and the absorption of effluent in septic tank absorption fields.

This soil is suited to corn, soybeans, and small grain if a suitable drainage system is established and maintained. Grasses and legumes for forage can also be grown. Capability unit IIw–5; woodland suitability group 9.

Rossmoyne silt loam, 2 to 6 percent slopes, eroded (RsB2).—This soil of the uplands is on narrow ridges and short breaks between nearly level ridges and sloping hillsides. These areas range from about 40 to 200 acres in size. This soil has the profile described as representative for the Rossmoyne series.

Included with this soil in mapping were small areas of nearly level Avonburg and Rossmoyne soils and small areas of gently sloping and moderately sloping Cincinnati soils. Also included were small areas of a deep, moderately well drained soil underlain by sand and gravel from glacial outwash. Severely eroded areas less than 3 acres in size are identified on the detailed soil map by a spot symbol.

Runoff and erosion are the major hazards and the very slowly permeable fragipan is the major limitation in the use and management of this moderately well drained soil. The fragipan restricts the penetration of roots, the downward movement of water, and the absorption of effluent in septic tank absorption fields.

This soil is suited to corn, soybeans, and small grain if a suitable system for controlling erosion is established and maintained. Grasses and legumes for forage can also be grown. Capability unit IIe–7; woodland suitability group 9.

Rossmoyne silt loam, 2 to 6 percent slopes, severely eroded (RsB3).—This soil of the uplands is on narrow ridges and short breaks between nearly level ridges and sloping hillsides. These areas range from about 5 to 20 acres in size. This soil has a profile similar to the one described as representative for the series, but the surface layer is less than 3 inches thick, less friable,

lower in organic matter content and fertility, and more difficult to keep in good tilth. Also, this soil is shallower to a fragipan.

Included with this soil in mapping were small areas of gently sloping, eroded Avonburg and Rossmoyne soils. Also included were small areas of moderately sloping, well-drained Cincinnati and Jennings soils.

Runoff and erosion are the major hazards and the very slowly permeable fragipan is the major limitation in the use and management of this moderately well-drained soil. The fragipan restricts the penetration of roots, the downward movement of water, and the absorption of effluent in septic tank absorption fields.

This soil is suited to corn, soybeans, and small grain if a suitable system for controlling erosion is established and maintained. Grasses and legumes for forage can also be grown. Capability unit IIIe–7; woodland suitability group 9.

Russell Series

The Russell series consists of deep, gently sloping, well-drained soils. These soils of the uplands are on ridges. They formed in loess and the underlying loamy glacial till.

In a representative profile, the surface layer is very dark grayish-brown silt loam about 2 inches thick. The subsurface layer is grayish-brown silt loam about 7 inches thick. The subsoil extends to a depth of about 53 inches. It is dark-brown and yellowish-brown, friable and firm heavy silt loam and silty clay loam in the upper 15 inches and dark yellowish-brown, brown, and yellowish-brown firm clay loam in the lower 29 inches. The underlying material, extending to a depth of 60 inches, is yellowish-brown and brown light clay loam.

Permeability is moderate, and the available water capacity and organic-matter content are high. Runoff is rapid.

Russell soils are mapped only in a complex with Fincastle soils.

Representative profile of Russell silt loam in an area of Fincastle-Russell silt loams, 2 to 6 percent slopes, eroded, in a pasture at a point 20 feet east and 936 feet north of the southwest corner of the northwest quarter of sec. 30, T. 8 N., R. 7 E.

A1—0 to 2 inches, very dark grayish-brown (10YR 3/2) silt loam; moderate, medium, granular structure; friable; slightly acid; abrupt, smooth boundary.

A2—2 to 9 inches, grayish-brown (10YR 5/2) silt loam; moderate, thin, platy structure; friable; slightly acid; clear, smooth boundary.

B1—9 to 14 inches, dark-brown (10YR 3/3) heavy silt loam; moderate, medium, subangular blocky structure; friable; common, discontinuous, prominent, thin, dark yellowish-brown (10YR 4/4) clay films on faces of peds; strongly acid; clear, wavy boundary.

B21t—14 to 24 inches, yellowish-brown (10YR 5/4) silty clay loam; moderate, medium, subangular and angular blocky structure; firm; many, continuous, prominent, medium and thin, dark-brown (7.5YR 4/4) clay films on faces of peds; strongly acid; clear, wavy boundary.

IIB22t—24 to 36 inches, dark yellowish-brown (10YR 4/4) clay loam; moderate, medium and coarse, subangular blocky structure; firm; many, continuous, prominent, medium and thin, dark-brown (10YR 4/3) clay films on faces of peds; few, patchy, prominent, light-gray (10YR 7/2) silt coatings on faces of peds in upper 2 to 3 inches; strongly acid; gradual, smooth boundary.

IIB23t—36 to 46 inches, brown (10YR 5/3) clay loam; weak, coarse, subangular blocky structure; firm; many, continuous, prominent, medium and thick, dark-brown (10YR 4/3) clay films on faces of peds; strongly acid; clear, smooth boundary.

IIB3t—46 to 53 inches, yellowish-brown (10YR 5/6) clay loam; weak, coarse, subangular blocky structure; firm; common, discontinuous, prominent, medium, dark yellowish-brown (10YR 4/4) clay films on faces of peds; neutral; clear, wavy boundary.

IIC—53 to 60 inches, yellowish-brown (10YR 5/4) and brown (10 YR 5/3) light clay loam; massive; firm; calcareous; moderately alkaline.

The solum ranges from about 42 to 70 inches in thickness. Thickness of the loess ranges from about 22 to 40 inches. Depth to carbonates ranges from about 10 to 70 inches. The A horizon ranges from strongly acid to neutral, depending on the amount of lime applied. The Ap horizon is dark grayish brown (10YR 4/2) or very dark grayish brown (10YR 3/2). The A2 horizon ranges from grayish brown (10YR 5/2) to yellowish brown (10YR 5/4). The Bt horizon has matrix colors ranging from dark brown (10YR 4/3) to yellowish brown (10YR 5/4) and is silty clay loam or clay loam. It is very strongly acid to medium acid. The B3 horizon has matrix colors ranging from dark brown (10YR 4/3) to yellowish brown (10YR 5/6), and it is medium acid to neutral loam or clay loam. The C horizon is brown (10YR 5/3) to yellowish brown (10YR 5/6).

Russell soils are adjacent to somewhat poorly drained Fincastle soils and well drained Miami soils. They have a thicker mantle of loess, have a thicker solum, and are deeper to carbonates than Miami soils.

Steff Series

The Steff series consists of deep, nearly level, moderately well drained soils. These soils of the bottom lands occur as long, narrow bands. They formed in recent medium-textured alluvium.

In a representative profile, the surface layer is dark grayish-brown silt loam about 9 inches thick. The underlying material, to a depth of about 40 inches, is mottled brown and pale-brown, friable silt loam. Below this, to a depth of about 65 inches, it is mottled, light brownish-gray friable silt loam.

Permeability is moderate and the available water capacity is very high. The organic-matter content is moderate. These soils are subject to flooding, and runoff is slow. Depth to the seasonal high water table is 3 to 6 feet.

Representative profile of Steff silt loam, in a cultivated field at a point 500 feet west and 1,200 feet north of the southeast corner of the northwest quarter of sec. 7, T. 5 N., R. 7 E.

Ap—0 to 9 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; friable; few small roots; strongly acid; abrupt, smooth boundary.

C1—9 to 15 inches, brown (10YR 5/3) silt loam; common, fine, faint, yellowish-brown (10 YR 5/6) mottles; weak, medium, granular structure; friable; strongly acid; clear, smooth boundary.

C2—15 to 40 inches, pale-brown (10YR 6/3) silt loam; many, fine, faint, light brownish-gray (10YR 6/2) mottles and few, fine, faint dark yellowish-brown (10YR 4/4 and 5/6) mottles; weak, medium, granular structure; friable; thin depositional strata in lower part; strongly acid; clear, smooth boundary.

C3—40 to 65 inches, light brownish-gray (10YR 6/2) silt loam; common, fine, distinct, yellowish-brown (10YR 5/4 and 5/6) mottles; massive; friable; thin depositional strata; few, medium iron and manganese concretions; strongly acid; clear, smooth boundary.

The soil, to a depth of about 40 inches, is strongly acid or very strongly acid. The Ap horizon ranges from dark grayish brown (10YR 4/2) to brown (10YR 5/3). The C1 and C2 horizons have matrix colors of brown (10 YR 5/3) to light yellowish brown (10YR 6/4). Mottles that have a chroma of 2 or less are at a depth of less than 24 inches. In some profiles the C2 horizon and C3 horizon consist of stratified silt loam, silty clay loam, and loam.

In Jennings County, Steff soils have evident rock structure in the upper part of the profile. These soils lack evidence of movement and aggregation of soil particles and, therefore, are outside the range as defined for the Steff series. This difference does not alter their usefulness and behavior.

Steff soils are adjacent to the somewhat poorly drained Stendal soils. They are less gray in the Ap horizon and C1 horizon than Stendal soils. Steff soils occupy bottom-land positions similar to those of Wilbur soils, and they have similar drainage. They are more acid than those soils.

Steff silt loam (0 to 2 percent slopes) (St).—This soil occupies long narrow bands on bottom lands. These areas range from about 10 to 200 acres in size.

Included with this soil in mapping were small areas of nearly level, well drained Haymond soils, nearly level, somewhat poorly drained Wakeland and Stendal soils, and nearly level, moderately well drained Wilbur soils. Gravelly spots are identified on the detailed soil map by a spot symbol.

Flooding is the major hazard in the use and management of this moderately well drained soil. Because of the flooding, the absorption of effluent is periodically restricted in septic tank absorption fields.

This soil is suited to corn, soybeans, and small grain. Grasses and legumes for forage can also be grown. Small grain and alfalfa are subject to severe damage during periods of prolonged flooding. Capability unit I–2; woodland suitability group 8.

Stendal Series

The Stendal series consists of deep, nearly level, somewhat poorly drained soils. These soils occupy long narrow bands on bottom lands adjacent to terraces or uplands. They formed in recent medium-textured alluvium.

In a representative profile, the surface layer is mottled dark grayish-brown silt loam about 7 inches thick. The underlying material, to a depth of about 40 inches, is mottled grayish-brown and light brownish-gray, friable silt loam. Below this, to a depth of about 72 inches, it is mottled, gray heavy silt loam.

Permeability is moderate, and the available water capacity is very high. The organic-matter content is moderate. Stendal soils are subject to flooding, and runoff is slow. Depth to the seasonal high water table is 1 to 3 feet.

Representative profile of Stendal silt loam, in a cultivated field at a point 450 feet north and 700 feet east of the southwest corner of sec. 6, T. 5 N., R. 7 E.

Ap—0 to 7 inches, dark grayish-brown (10YR 4/2) silt loam; common, fine, faint, grayish-brown (10YR 5/2) mottles; weak, fine, granular structure; friable; plentiful small roots; strongly acid; clear, smooth boundary.

C1g—7 to 15 inches, grayish-brown (10YR 5/2) silt loam; many, fine, faint, dark grayish-brown (10YR 4/2) mottles and few, fine, faint, light brownish-gray (10YR 6/2) mottles; weak, fine, granular structure; friable; few small roots; strongly acid; clear, smooth boundary.

C2g—15 to 40 inches, light brownish-gray (10YR 6/2) silt loam; common, fine and medium, faint, light yellowish-brown (10YR 6/4) and yellowish-brown (10YR 5/4 and 5/6) mottles; weak, medium, granular structure; friable; thin depositional strata in lower part; very strongly acid; clear, smooth boundary.

C3g—40 to 72 inches, gray (10YR 6/1) heavy silt loam; many, medium, distinct, yellowish-brown (10YR 5/4 and 5/6) and light yellowish-brown (10YR 6/4) mottles; massive; friable; thin depositional strata; small black (10YR 2/1) iron and manganese concretions; very strongly acid.

The soil, to a depth of about 40 inches, is strongly acid or very strongly acid. The Ap horizon ranges from dark grayish brown (10YR 4/2) to light gray (10YR 7/2). The C1g horizon and C2g horizon have matrix colors of grayish brown (10YR 5/2) or brown (10YR 5/3) to light brownish gray (10YR 6/2). In some profiles these horizons are stratified silt loam, silty clay loam, and loam.

Stendal soils are adjacent to moderately well drained Steff soils and poorly to very poorly drained Bonnie soils. Stendal soils are more gray in the upper part of the profile than Steff soils. They are less gray in the upper part of the profile than Bonnie soils. Stendal soils occupy bottom-land positions similar to those occupied by Wakeland soils, and they have similar drainage. They are more acid than those soils.

Stendal silt loam (0 to 2 percent slopes) (Sx).—This soil occupies long, narrow bands on bottom lands adjacent to higher terraces or uplands. These areas range from 10 to 500 acres in size.

Included with this soil in mapping were small areas of nearly level, somewhat poorly drained Wakeland soils; nearly level, moderately well-drained Steff soils; and nearly level or slightly depressional, poorly drained to very poorly drained Bonnie soils.

Flooding is the major hazard and wetness is the major limitation in the use and management of this somewhat poorly drained soil. Because of the flooding and the wetness, absorption of effluent is restricted in septic tank absorption fields.

This soil is suited to corn and soybeans if a suitable drainage system is established and maintained (fig. 12). Artificial drainage is sometimes difficult to establish because of the low position of this soil and difficulty in obtaining adequate outlets. Small grain and alfalfa are subject to severe damage during periods of prolonged flooding. Capability unit IIw–7; woodland suitability group 13.

Trappist Series

The Trappist series consists of moderately deep, well-drained soils. These soils of the uplands are moderately sloping on narrow ridges and breaks and strongly sloping on hillsides. They formed in loess and residuum weathered from underlying black shale.

In a representative profile, the surface layer is dark-brown silt loam about 6 inches thick. The subsoil extends to a depth of about 37 inches. It is dark-brown, friable silt loam and reddish-brown, firm silty clay loam

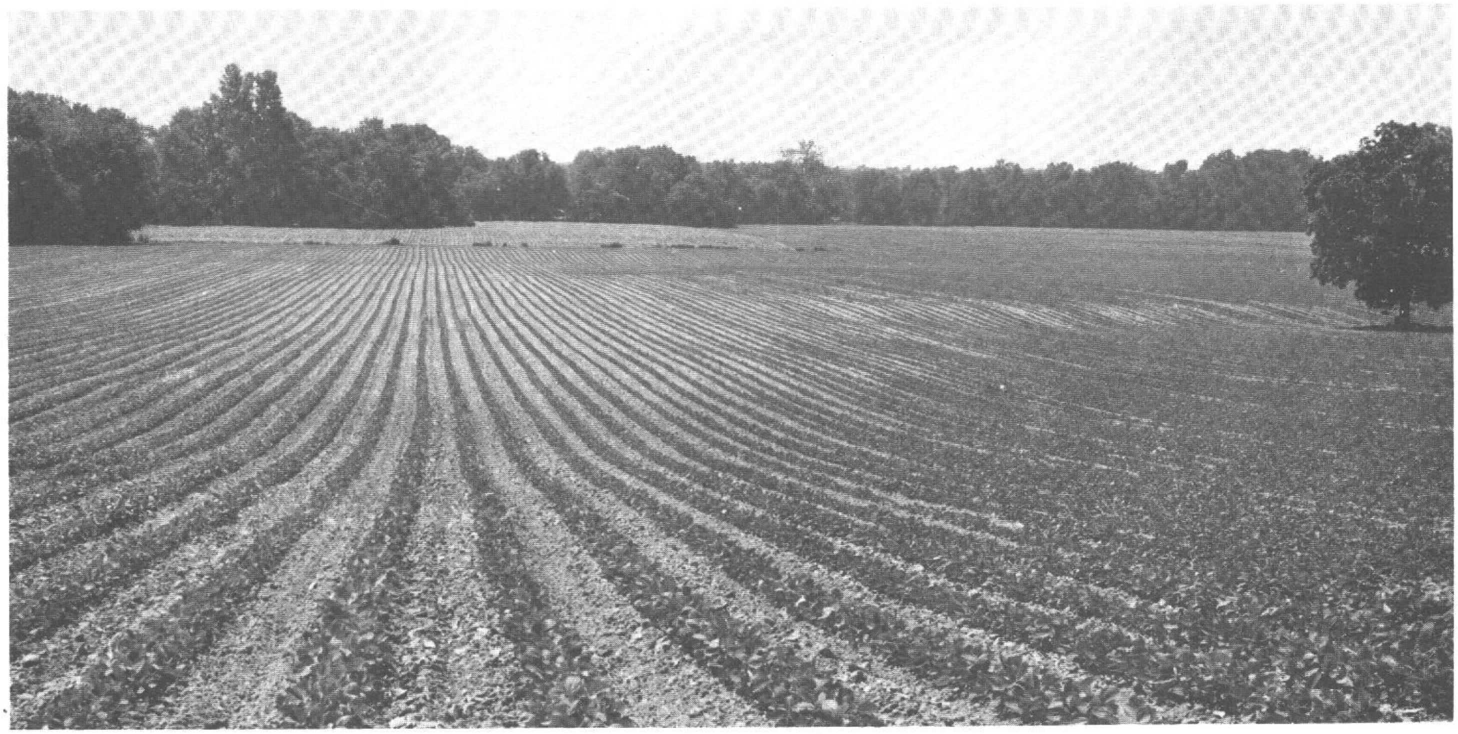

Figure 12.—**Good stand of soybeans. The soil is Stendal silt loam.**

in the upper 15 inches and yellowish-red and yellowish-brown, firm light silty clay in the lower 16 inches. The underlying material, extending to a depth of about 40 inches, is pale-brown weathered shale that has a texture of silty clay loam. Below this is black shale bedrock.

Permeability is slow and the available water capacity is moderate. The organic-matter content is generally moderate, but it is low in severely eroded areas.

Representative profile of Trappist silt loam, 6 to 12 percent slopes, eroded, in a meadow at a point 100 feet east and 750 feet south of the northwest corner of the southwest quarter of sec. 32, T. 6 N., R. 9 E.

Ap—0 to 6 inches, dark-brown (10YR 4/3) silt loam; weak, medium, granular structure; friable; plentiful small roots; strongly acid; abrupt, smooth boundary.

B1—6 to 8 inches, dark-brown (7.5YR 4/4) heavy silt loam; weak, medium, subangular blocky structure; friable; plentiful small roots; very strongly acid; abrupt, smooth boundary.

B21t—8 to 15 inches, reddish-brown (5YR 4/4) light silty clay loam; moderate, medium, subangular blocky structure; firm; many, discontinuous, thin, dark-reddish brown (5YR 3/4) clay films on faces of peds; very strongly acid; clear, smooth boundary.

IIB22t—15 to 21 inches, reddish-brown (5YR 4/4) heavy silty clay loam; strong, medium, angular and subangular blocky structure; firm; many, discontinuous thin, dark reddish-brown (5YR 3/4) clay films on faces of peds; very strongly acid; clear, wavy boundary.

IIB23t—21 to 33 inches, yellowish-red (5YR 5/6) light silty clay; few light brownish-gray (10YR 6/2) and grayish-brown (10YR 5/2) relict mottles from shale; strong, medium, angular blocky structure; firm; many, discontinuous, thin, strong-brown (7.5YR 5/6) clay films on faces of peds; shale fragments make up 5 percent, by volume, of the lower part of this horizon; very strongly acid; gradual, wavy boundary.

IIB3—33 to 37 inches, yellowish-brown (10YR 5/4) light silty clay; many light brownish-gray (10YR 6/2) and grayish-brown (10YR 5/2) relict mottles from shale; weak, thick, platy structure; firm; few, discontinuous, thin, strong-brown (7.5YR 5/6) clay films on faces of peds and shale fragments; many black concretions; 15 percent, by volume, shale fragments and few sandstone fragments; 50 percent, by volume, material larger than 2 millimeters; very strongly acid; gradual, wavy boundary.

IIC—37 to 40 inches, pale-brown (10YR 6/3) weathered shale that has a texture of silty clay loam; few sandstone fragments; 60 percent, by volume, material larger than 2 millimeters; very strongly acid.

IIR—40 inches, black shale bedrock.

The solum ranges from about 20 to 40 inches in thickness. Thickness of loess ranges from 15 to 30 inches. Depth to bedrock ranges from 30 to 40 inches. Reaction to the solum below the Ap horizon is dominantly strongly acid or very strongly acid. The Ap horizon ranges from dark grayish brown (10YR 4/2) to dark yellowish brown (10YR 4/4). It is strongly acid to neutral, depending on the amount of lime applied. The Bt horizon has matrix colors ranging from reddish brown (5YR 4/4) to yellowish brown (10YR 5/6). It is silt loam or silty clay loam in the upper part and silty clay loam to clay in the lower part. The C horizon ranges from silty clay loam to clay, and it is extremely acid to strongly acid.

Trappist soils are adjacent to the shallow Weikert soils, and they formed in similar material. Also they have a thicker solum and are deeper to black shale bedrock than those soils. Trappist soils have drainage similar to that of Cincinnati soils, but they have a thinner solum and a redder, more clayey B horizon than those soils. Also they lack a fragipan, which Cincinnati soils have. Trappist soils are adjacent to deep, well-drained Jennings soils, but they have a redder, more clayey B horizon. They lack a fragipan, which those soils have.

Trappist silt loam, 6 to 12 percent slopes, eroded (TrC2).—This soil of the uplands is on narrow ridges and broad hillsides. These areas range from about 10 to 60 acres in size. This soil has the profile described as representative for the Trappist series.

Included with this soil in mapping were small areas of strongly sloping, eroded Trappist soils. Also included were small areas of strongly sloping, eroded Trappist soils and some areas that have bedrock at a depth of 40 to 50 inches. Severely eroded areas that are less than 3 acres in size are identified on the detailed soil map by a spot symbol.

Runoff and erosion are the main hazards in the use and management of this well-drained soil. The slow permeability and the moderate depth to bedrock restrict absorption of effluent in septic tank absorption fields.

This soil is suited to small grains and to grasses and legumes for forage if a suitable system for controlling erosion is established and maintained. Runoff and the erosion hazard limit the use of this soil for row crops. Capability unit IVe–8; woodland suitability group 10.

Trappist silt loam, 12 to 18 percent slopes, eroded (TrD2).—This soil of the uplands is on narrow ridges and broad hillsides. These areas range from about 10 to 60 acres in size. This soil has a profile similar to the one described as representative for the series, but it has a thinner mantle of loess and is shallower to black shale bedrock.

Included with this soil in mapping were small areas of strongly sloping, severely eroded Trappist soils; strongly sloping, eroded, well-drained Jennings soils; moderately steep, shallow, well-drained Weikert soils. Also included were some areas of soil where bedrock is at a depth of 40 to 50 inches. Severely eroded areas that are less than 3 acres in size and escarpments are identified on the detailed soil map by spot symbols.

Runoff and erosion are the major hazards in the use and management of this well-drained soil. The slow permeability and moderate depth of this soil restrict absorption of effluent in septic tank absorption fields.

This soil is suited to grasses and legumes for forage if a suitable system for controlling erosion is established and maintained. Some areas are used for woodland. Capability unit VIe–1; woodland suitability group 10.

Trappist silty clay loam, 6 to 12 percent slopes, severely eroded (TsC3).—This soil is on narrow ridges and broad hillsides. These areas range from about 10 to 40 acres in size. This soil has a profile similar to the one described as representative for the series, but the surface layer is less than 3 inches thick, and has finer texture. Also, it is less friable, has lower organic-matter content and fertility, and is more difficult to keep in good tilth.

Included with this soil in mapping were small areas of moderately sloping, eroded Trappist soils, and strongly sloping, severely eroded Trappist soils. Also included were some areas where bedrock is at a depth of 40 to 50 inches and small areas of moderately sloping, severely eroded Jennings soils. Gullies and very severely eroded areas are identified on the detailed soil map by spot symbols.

Runoff and erosion are the major hazards in the use and management of this well-drained soil. The slow permeability and moderate depth to bedrock of this soil restrict absorption of effluent in septic tank absorption fields.

This soil is suited to grasses and legumes for forage if a suitable system for controlling erosion is established and maintained. Some areas have been planted to pine trees or have been allowed to reforest naturally. This soil is suited to pines for Christmas trees. Capability unit VIe–1; woodland suitability group 10.

Trappist silty clay loam, 12 to 18 percent slopes, severely eroded (TsD3).—This soil of the uplands is on narrow ridges and broad hillsides. These areas range from about 10 to 60 acres in size. This soil has a profile similar to the one described as representative for the series, but it has a thinner mantle of loess and is shallower to black shale bedrock. Also, the surface layer is less than 3 inches thick, has finer texture, is less friable, is lower in organic-matter content and fertility, and is more difficult to keep in good tilth.

Included with this soil in mapping were small areas of severely eroded, well-drained Jennings soils, and moderately steep, shallow, well-drained Weikert soils; also included were some areas where bedrock is at a depth of 40 to 50 inches. Gullies, very severely eroded areas, and escarpments other than bedrock are identified on the detailed soil map by spot symbols.

Runoff and erosion are the major hazards in the use and management of this well-drained soil. The slow permeability and the moderate depth to bedrock of this soil restrict absorption of effluent in septic tank absorption fields.

This soil is suited to permanent pasture or woodland, but it is better suited to woodland because of runoff and the hazard of erosion. Some areas have been planted to pine trees or have been allowed to reforest naturally. This soil is suited to pines for Christmas trees if a suitable system for controlling erosion is established and maintained. Capability unit VIIe–1; woodland suitability group 10.

Wakeland Series

The Wakeland series consists of deep, nearly level, somewhat poorly drained soils. These soils of the bottom lands are in long narrow areas. They formed in recent, medium-textured alluvium.

In a representative profile, the surface layer is grayish-brown silt loam about 8 inches thick. The underlying material, to a depth of about 34 inches, is mottled grayish-brown and light brownish-gray, friable silt loam. Below this, extending to a depth of 65 inches, it is mottled yellowish-brown, light yellowish-brown, light brownish-gray, and dark-brown silt loam.

Permeability is moderate, and the available water capacity is very high. The organic-matter content is low. Wakeland soils are subject to flooding, and runoff is slow. Depth to the seasonal high water table is 1 to 3 feet.

Representative profile of Wakeland silt loam, in a cultivated field at a point 50 feet east and 50 feet north of the southwest corner of the southeast quarter of sec. 6, T. 6 N., R. 7 E.

Ap—0 to 8 inches, grayish-brown (10YR 5/2) silt loam; few, fine, faint, pale-brown (10YR 6/3) mottles; moderate, medium, granular structure; friable; few, fine, black concretions; many small roots; neutral; abrupt, smooth boundary.

C1—8 to 14 inches, grayish-brown (10YR 5/2) silt loam; many, fine, distinct, yellowish-brown (10YR 5/4 and 5/6) and light brownish-gray (10YR 6/2) mottles; moderate, medium, granular structure; friable; few, fine, black (10YR 2/1) iron and manganese concretions; neutral; clear, smooth boundary.

C2—14 to 34 inches, light brownish-gray (10YR 6/2) and grayish-brown (10YR 5/2) silt loam; many, fine, distinct, yellowish-brown (10YR 5/4 and 5/6), brown (10YR 5/3), and dark yellowish-brown (10YR 4/4) mottles; weak, medium, granular structure; friable; thin depositional strata in lower part; few small very dark-brown (10YR 2/2) iron and manganese concretions; neutral; clear, smooth boundary.

C3—34 to 65 inches, mottled yellowish-brown (10YR 5/4 and 5/6), light yellowish-brown (10YR 6/4), light brownish-gray (10YR 6/2), and dark-brown (7.5YR 4/4) silt loam; massive; friable; thin depositional strata; few small very dark-brown (10YR 2/2) iron and manganese concretions; neutral.

The Ap horizon ranges from dark grayish brown (10YR 4/2) to brown (10YR 5/3). It is medium acid to neutral, depending on the amount of lime applied. The C1 horizon and C2 horizon have matrix colors of dark grayish brown (10YR 4/2) to pale brown (10YR 6/3). These horizons are medium acid to neutral. In some places these horizons are stratified silt loam, silty clay loam, and loam.

Wakeland soils are adjacent to the moderately well-drained Wilbur soils, and they formed in similar material. Wakeland soils have more gray mottles in the upper part than Wilbur soils. They occupy bottom-land positions similar to those occupied by Stendal soils, and they have similar drainage. They are less acid than those soils.

Wakeland silt loam (0 to 2 percent slopes) (Wa).—This soil occupies long, narrow bands on bottom lands adjacent to higher terraces or uplands. Areas range from 10 to 200 acres in size.

Included with this soil in mapping were small areas of nearly level, somewhat poorly drained Stendal soils; nearly level, moderately well-drained Steff and Wilbur soils; and nearly level or slightly depressional, poorly drained to very poorly drained Bonnie soils.

Flooding is the major hazard and wetness is the major limitation in the use and management of this soil. Because of flooding and wetness, absorption of effluent is restricted in septic tank absorption fields.

This soil is suited to corn and soybeans if a suitable drainage system is established and maintained. Artificial drainage is difficult to establish in some places because of the low position and the difficulty in obtaining adequate outlets. Small grain and alfalfa are subject to severe damage during periods of prolonged flooding. Capability unit IIw–7; woodland suitability group 13.

Weikert Series

The Weikert series consists of shallow, moderately steep to very steep, well-drained soils. These soils of the uplands are on hillsides adjacent to natural drainageways. These soils formed in residuum weathered from shale bedrock.

In a representative profile, the surface layer is dark grayish-brown shaly silt loam about 4 inches thick. The subsoil is brown, friable shaly silt loam about 9 inches thick. The underlying material, extending to a depth of about 17 inches, is shaly silt loam. Below this is black shale bedrock.

Permeability is moderately rapid, and the available water capacity is low. The organic-matter content is moderate. Runoff is very rapid.

Representative profile of Weikert shaly silt loam, 18 to 40 percent slopes, eroded, in a wooded area at a point 800 feet south and 1,200 feet east of the northwest corner of sec. 11, T. 6 N., R. 7 E.

O1—2 inches to 1 inch, loose, undecomposed leaves and twigs of hardwoods.

O2—1 inch to 0, partly decomposed leaves, twigs, and roots.

A1—0 to 4 inches, dark grayish-brown (10YR 4/2) shaly silt loam; moderate, fine, granular structure; friable; plentiful small and medium roots; strongly acid; clear, smooth boundary.

B2—4 to 13 inches, brown (10YR 5/) shaly silt loam; weak, medium, subangular blocky structure; friable; few large roots; 30 percent, by volume, brown and black shale fragments; very strongly acid; gradual, wavy boundary.

C—13 to 17 inches, yellowish-brown (10YR 5/4) shaly silt loam; massive; very friable; 60 percent, by volume, brown and black shale fragments; very strongly acid; gradual, wavy boundary.

R—17 inches, black shale bedrock.

The solum ranges from about 8 to 20 inches in thickness. Depth to black shale bedrock ranges from about 10 to 20 inches. The solum is strongly acid or very strongly acid. Soft shale fragments in the solum below the A horizon range from 50 to 80 percent, by volume. The A1 horizon is dark grayish brown (10YR 4/2) or very dark grayish brown (10YR 3/2), and it is silt loam or shaly silt loam. The B horizon ranges from dark brown (7.5YR 4/4) to yellowish brown (10YR 5/4), and it is shaly silt loam or shaly silty clay loam. The C horizon ranges from brown (7.5YR 5/4) to yellowish brown (10YR 5/4), and it is shaly silt loam or shaly silty clay loam.

Weikert soils are adjacent to the moderately deep Trappist soils, and they formed in similar material. They have a thinner solum and are shallower to black shale bedrock than Trappist soils. Weikert soils have drainage similar to that of Corydon soils, and they have bedrock at a similar depth. They formed in residuum weathered from shale, but Corydon soils formed in residuum weathered from cherty limestone. Weikert soils have a more acid and less clayey B horizon than Corydon soils.

Weikert shaly silt loam, 18 to 40 percent slopes, eroded (WkE2).—This soil of the uplands occupies hillsides adjacent to natural drainageways. These areas range from about 10 to 100 acres in size. Shale rock crops out in some places.

Included with this soil in mapping were areas of moderately steep to very steep, shallow, well-drained Corydon soils; strongly sloping and moderately steep, eroded and severely eroded, well-drained Trappist soils; and nearly level, well-drained Haymond soils. Escarpments other than bedrock and areas of rock outcrop are identified on the detailed soil map by spot symbols.

Runoff and erosion are the major hazards, and the shallow depth to bedrock and the low available water capacity are the major limitations in the use and management of this well-drained soil.

This soil is suited to permanent pasture or woodland, but it is better suited to woodland because of the runoff and the erosion hazard. Capability unit VIIe–2; woodland suitability group 22.

Wilbur Series

The Wilbur series consists of deep, nearly level, moderately well drained soils. These soils of the bottom lands are in long and narrow areas. They formed in recent, medium-textured alluvium.

In a representative profile, the surface layer is mottled dark-brown silt loam about 9 inches thick. The underlying material, to a depth of about 36 inches, is mottled yellowish-brown, friable silt loam. Below this, extending to a depth of 60 inches, it is mottled, pale-brown and yellowish-brown silt loam and loam.

Permeability is moderate, and the available water capacity is very high. The organic-matter content is moderate. Wilbur soils are subject to flooding, and runoff is slow. Depth to the seasonal high water table is 3 to 6 feet.

Representative profile of Wilbur silt loam, in a cultivated field at a point 50 feet south and 200 feet east of the northwest corner of the northeast quarter of sec. 7, T. 6 N., R. 7 E.

Ap—0 to 9 inches, dark-brown (10YR 4/3) silt loam; few, medium, faint, pale-brown (10YR 6/3) mottles; weak, fine, granular structure; friable; plentiful small roots; neutral; abrupt, smooth boundary.

C1—9 to 18 inches, yellowish-brown (10YR 5/4) silt loam; few, fine, faint, pale-brown (10YR 6/3) mottles; weak, medium, granular structure; friable; few small roots; slightly acid; clear, smooth boundary.

C2—18 to 36 inches, yellowish-brown (10YR 5/4) silt loam; many, fine, distinct, light brownish-gray (10YR 6/2) and pale-brown (10YR 6/3) mottles; weak, medium, granular structure; friable; slightly acid; clear, smooth boundary.

C3—36 to 52 inches, pale-brown (10YR 6/3) silt loam; many, fine, distinct, yellowish-brown (10YR 5/4 and 5/6), dark yellowish-brown (10YR 4/4), and light brownish-gray (10YR 6/2) mottles; massive; friable; thin depositional strata in lower part; slightly acid; clear, smooth boundary.

IIC4—52 to 60 inches, yellowish-brown (10YR 5/4) loam; many, fine, faint, pale-brown (10YR 6/3) and light yellowish-brown (10YR 6/4) mottles and many, fine, distinct, light brownish-gray (10YR 6/2) mottles; massive; friable, thin depositional strata; few small iron and manganese concretions; slightly acid.

The Ap horizon ranges from dark grayish brown (10YR 4/2) to brown (10YR 5/3). It is medium acid to neutral, depending on the amount of lime applied. The C1 horizon and C2 horizon have matrix colors of dark brown (10YR 4/3) to yellowish brown (10YR 5/4). These horizons are medium acid or slightly acid. Mottles that have a chroma of 2 or less are at a depth of less than 24 inches. The C3 and C4 horizons are stratified silt loam, silty clay loam, and loam.

Wilbur soils are adjacent to the well-drained Haymond soils and the somewhat poorly drained Wakeland soils, and they formed in similar materials. They have more gray mottling than Haymond soils and less gray mottling than Wakeland soils. Wilbur soils occupy bottom-land positions similar to those occupied by Steff soils. They have drainage similar to that of Steff soils, but they are not so acid.

Wilbur silt loam (0 to 2 percent slopes) (Wu).—This soil occupies long narrow bands on bottom lands. These areas range from about 10 to 500 acres in size.

Included with this soil in mapping were small areas of nearly level, well-drained Haymond soils; nearly level, somewhat poorly drained Wakeland soils; and nearly level, moderately well drained Eel and Steff soils. Gravelly spots are identified on the detailed soil map by a spot symbol.

Flooding is the major hazard in the use and management of this moderately well drained soil. Because of flooding, absorption of effluent is periodically restricted in septic tank absorption fields.

This soil is suited to corn, soybeans, and small grain. Grass and legumes for forage can also be grown. Small grain and alfalfa are subject to severe damage during periods of prolonged flooding. Capability unit I–2; woodland suitability group 8.

Use and Management of the Soils

This section explains the system of capability grouping used by the Soil Conservation Service and discusses the management of the soils in Jennings County by capability units. Predicted yields of the principal crops are given. Also discussed are management of soils for woodland and wildlife habitat. The properties and features that affect recreation, engineering practices, and town and country planning are listed, mainly in tables. Detailed information on the use and management of soils can be obtained at the local office of the Soil Conservation Service and from the Jennings County Cooperative Extension Service.

Use of the Soils for Crops

About 40 percent of the acreage in Jennings County is used for crops. The main crops are corn, soybeans, small grains, and grasses and legumes for forage. A small acreage is in special crops.

Some of the major management concerns are wetness, water erosion, maintenance of fertility and organic-matter content, and maintenance of good tilth or improvement of tilth. Of the land capable of intensive cultivation, about 19 percent is limited by wetness and 44 percent by hazard of erosion. Only 7 percent of the acreage has few limitations for crops *(2)*.

The major management practices are installing tile drainage systems, grassed waterways, contour farming, diversion terracing, grade stabilizing, minimum tillage, using crop residues, green manure crops, and winter cover crops, and, for most of the soils, applying lime and fertilizer in amounts indicated by the results of tests and field trials.

Capability grouping

Capability grouping shows, in a general way, the suitability of soils for most kinds of field crops. The groups are based on the limitations of the soils when used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; and does not apply to rice, cranberries, horticultural crops, or other crops requiring special management.

Those familiar with the capability classification can infer from it much about the behavior of soils when used for other purposes, but this classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for range, for forest trees, or engineering.

In the capability system *(12)*, all kinds of soils are grouped at three levels, the capability class, subclass, and unit. These are discussed in the following paragraphs.

CAPABILITY CLASSES, the broadest grouping, are designated by Roman numerals I through VIII. As the numerals increase they indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have some limitations that reduce the choice of plants or require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants, require special conservation practices, or both.

Class IV soils have very severe limitations that restrict the choice of plants, require very careful management, or both.

Class V soils are subject to little or no erosion but have other limitations, impractical to remove, that limit their use largely to pastures, range, woodland, or wildlife food and cover. (No class V soils are in this county.)

Class VI soils have severe limitations that make them generally unsuited to cultivation without major reclamation and limit their use largely to pasture, range, woodland, or wildlife food and cover.

Class VII soils have very severe limitations that make them unsuited to cultivation without major reclamation and restrict their use largely to range, woodland, or wildlife food and cover.

Class VIII soils and landforms have limitations that preclude their use for commercial plant production without major reclamations and restrict their use to recreation, wildlife, water supply, or esthetic purposes. (No class VIII soils are in this county).

CAPABILITY SUBCLASSES are soil groups within one class. They are designated by adding a small letter, **e**, **w**, **s**, or **c**, to the class numeral, for example, IIe. The letter **e** shows that the main limitation is risk of erosion; **w** shows that water on or in the soil interferes with plant growth or cultivation; **s** shows that the soil is limited mainly because it is shallow, droughty, or stony; and **c**, used only in some parts of the United States, shows that the chief limitation is climate that is too cold or too dry.

In Class I there are no subclasses, because the soils of this class have few limitations. Class V can contain, at the most, only the subclasses indicated by **w**, **s**, and **c**, because the soils in Class V are subject to little or no erosion, though they have other limitations that restrict their use largely to pasture, range woodland, wildlife habitat, or recreation.

CAPABILITY UNITS are soil groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-1 or IIIw-12.

Management by capability units

In the following pages, the capability units in Jennings County are described and suggestions for the use and management of the soils are given. The units are not numbered consecutively, because not all the units in the statewide system are represented in this county. The names of the soil series are mentioned in the description of each capability unit, but the listing of the series name does not necessarily indicate that all soils of a series are in the capability unit. To find the capability classification of each soil, refer to the "Guide to Mapping Units" at the back of this survey.

CAPABILITY UNIT I-1

Elkinsville silt loam, 0 to 2 percent slopes; is the only soil in this unit. It is a deep, well-drained, medium-textured soil in broad areas of terraces.

This soil is moderate in organic-matter content and low in natural fertility. It has moderate permeability. The surface layer is strongly acid to neutral, depending on the amount of lime applied. This soil has no hazards or limitations, and it can be intensively cultivated. The major needs in management are maintenance of the organic-matter content and natural fertility and improvement and maintenance of good soil tilth.

This soil is suited to corn, soybeans, small grain, and hay and pasture plants. Use of crop residue and green-manure crops help to improve and maintain organic-matter content.

CAPABILITY UNIT I-2

This unit consists of deep, nearly level soils of the Eel, Genesee, Haymond, Steff, and Wilbur series. These are well drained and moderately well drained, medium-textured soils on bottom lands along streams.

Organic-matter content is low in the Eel soil but moderate in the other soils. Natural fertility is low in the Steff soil but moderate in the other soils. The soils in this unit have high or very high available water capacity. They are moderate in permeability. The surface layer of these soils is strongly acid to neutral, depending on the amount of lime applied. From December to June flooding is the major hazard. The major needs in management are improvement and maintenance of organic-matter content and fertility.

These soils are suited to corn, soybeans, small grain, and hay and pasture. Alfalfa and fall-planted small grain are subject to severe damage during periods of prolonged flooding. Use of crop residue and green-manure crops helps to improve and maintain organic-matter content.

CAPABILITY UNIT IIe-1

Parke silt loam, 2 to 6 percent slopes, eroded, is the only soil in this unit. It is a deep, well-drained, medium-textured soil on broad ridges of outwash plains between bottom lands or terraces and uplands.

This soil is moderate in organic-matter content and low in natural fertility. It has high available water capacity and moderate permeability. The surface layer is strongly acid to neutral, depending on the amount of

lime applied. Erosion and runoff are hazards. The major needs in management are maintenance of the organic-matter content, improvement of fertility, maintenance of good soil tilth, and control of erosion.

This soil is suited to corn, soybeans, small grain, and hay and pasture plants. Minimum tillage, contour farming, and grassed waterways help to control erosion. Use of crop residue and green-manure crops helps to increase the organic-matter content and to improve fertility.

CAPABILITY UNIT IIe-3

This unit consists of deep, gently sloping, eroded soils of the Elkinsville and Grayford series. These are well-drained, medium-textured soils on terraces and uplands.

These soils are moderate in organic-matter content and low in natural fertility. They have a high available water capacity and moderate permeability. The surface layers of these soils is strongly acid to neutral, depending on the amount of lime applied. Erosion and runoff are hazards. The major needs in management are maintenance of organic-matter content, improvement of fertility, maintenance of good soil tilth, and control of erosion.

These soils are suited to corn, soybeans, small grain, and hay and pasture plants. In addition, they are well suited to alfalfa. Minimum tillage, contour farming, and grassed waterways help to control erosion. Use of crop residue and green-manure crops helps to increase organic-matter content and improve fertility.

CAPABILITY UNIT IIe-7

This unit consists of deep, gently sloping, eroded soils of the Cincinnati, Jennings, Pekin, and Rossmoyne series. These are medium-textured soils that have a fragipan. The Cincinnati and Jennings soils are well drained, and the Pekin and Rossmoyne soils are moderately well drained. The Pekin soil is on terraces, and the other soils are on uplands.

Organic-matter content is moderate in the Jennings soil but low in the other soils. Natural fertility is low. The available water capacity is moderate, and permeability is very slow. The surface layer of these soils is very strongly acid to neutral, depending on the amount of lime applied. Erosion and runoff are hazards. These soils are somewhat droughty late in summer in years when rainfall is below normal or poorly distributed, and occasionally damage to crops results. The Cincinnati and Jennings soils can be farmed early in spring, but on Pekin and Rossmoyne soils, wetness is a limitation and, in spring, can cause prolonged delays in farming operations. The major needs in management are maintenance of organic-matter content and fertility, improvement and maintenance of good soil tilth, and control of erosion.

These soils are suited to corn, soybeans, small grain, hay and pasture plants. They are not well suited to alfalfa because the fragipan restricts the penetration of roots and the soil is wet early in spring. Minimum tillage, contour farming, and grassed waterways help to control erosion. Use of crop residue and green-manure crops helps to increase organic-matter content, improve fertility, and to control erosion.

CAPABILITY UNIT IIe-12

This unit consists only of Fincastle-Russell silt loams, 2 to 6 percent slopes, eroded. These are deep, medium-textured soils on uplands. The Fincastle soil is somewhat poorly drained, and the Russell soil is well drained.

Organic-matter content is moderate in the Fincastle soil and high in the Russell soil. Both soils are low in natural fertility and have high available water capacity. Permeability is slow in the Fincastle soil and moderate in the Russell soil. The surface layer of these soils is strongly acid to neutral, depending on the amount of lime applied. Runoff is slow to rapid, and erosion is the major hazard. Wetness is a limitation on the Fincastle soil. The management needs are improvement and maintenance of organic-matter content and fertility and control of erosion and wetness.

These soils are suited to corn and soybeans if a suitable system for controlling erosion and drainage is established and maintained. They are also suited to hay and pasture plants. Fincastle soils are not well suited to alfalfa because of prolonged, excessive wetness. Use of crop residue and green-manure crops helps to control erosion and to improve organic-matter content and fertility.

CAPABILITY UNIT IIe-13

Avonburg silt loam, 2 to 4 percent slopes, eroded, is the only soil in this unit. It is a deep, somewhat poorly drained, medium-textured soil that has a fragipan. This soil is on uplands.

This soil is low in organic-matter content and natural fertility. It has moderate available water capacity. Permeability is very low. The fragipan in the subsoil restricts the penetration of roots and the movement of water and air. The surface layer is strongly acid to neutral, depending on the amount of lime applied. Runoff and erosion are the major hazards in use and management of this soil. Wetness and the very slowly permeable fragipan are the major limitations. The major needs in management are improvement and maintenance of organic-matter content and fertility and control of erosion and wetness.

This soil is suited to corn, soybeans, and small grain if a suitable system for controlling erosion and drainage is established and maintained. It is not well suited to alfalfa because of the prolonged, excessive wetness of the soil and the fragipan that restricts root development. Use of crop residue and green-manure crops helps to control erosion and improve organic-matter content and fertility.

CAPABILITY UNIT IIw-1

Brookston silty clay loam is the only soil in this unit. It is a deep, very poorly drained, moderately fine textured, nearly level or slightly depressed soil on uplands.

This soil is high in organic-matter content and moderate in natural fertility. It has high available water capacity and slow permeability. The surface layer is neutral. Runoff is very slow or ponded, and wetness and puddling of the surface are the main limitations. If this soil is cultivated or pastured when wet, the surface layer becomes hard and cloddy. The major needs in management are maintenance of organic-matter content and good soil tilth, as well as control of wetness.

This soil is suited to corn, soybeans, and hay and pasture plants if a suitable drainage system is established and maintained. It is not well suited to alfalfa because of prolonged, excessive wetness. Use of crop residue, green-manure crops, winter cover crops helps to maintain organic-matter content. These practices along with minimum tillage help to maintain and improve soil tilth and fertility.

CAPABILITY UNIT IIw-2

Fincastle silt loam, 0 to 3 percent slopes, is the only soil in this unit. It is a deep, somewhat poorly drained, medium-textured soil on uplands.

This soil is moderate in organic-matter content and low in natural fertility. It has high available water capacity. Permeability is slow. The surface layer is strongly acid to neutral, depending on the amount of lime applied. Runoff is slow, and wetness is the major limitation. The management needs are improvement and maintenance of organic-matter content and fertility, and control of wetness.

This soil is suited to corn and soybeans if a suitable drainage system is established and maintained. It is not well suited to alfalfa because of prolonged, excessive wetness. Use of crop residue and green-manure crops helps to improve organic-matter content and fertility.

CAPABILITY UNIT IIw-3

This unit consists of deep, nearly level soils of the Avonburg and Bartle series. These are somewhat poorly drained, medium-textured soils that have a fragipan. They are on uplands.

Organic-matter content is low in Avonburg soils and moderate in Bartle soils. These soils have low natural fertility. They have moderate available water capacity and very slow permeability. The fragipan in the subsoil restricts the penetration of roots and the movement of water and air. The surface layer is strongly acid to neutral, depending on the amount of lime applied. Wetness and the very slowly permeable fragipan are the major limitations. Management needs are improvement and maintenance of organic-matter content and fertility and control of wetness.

These soils are suited to corn, soybeans, and small grain if a suitable drainage system is established and maintained. They are not well suited to alfalfa because wetness is prolonged and excessive, and root development is restricted by the fragipan. Use of crop residue and green-manure crops helps to increase organic-matter content and fertility.

CAPABILITY UNIT IIw-5

This unit consists of deep, nearly level soils of the Pekin and Rossmoyne series. These are moderately well drained, medium-textured soils that have a fragipan. The Pekin soil is in broad areas on terraces, and Rossmoyne soil is on narrow ridges of the uplands.

These soils are low in organic-matter content and natural fertility. They have moderate available water capacity and very slow permeability. The fragipan in the subsoil restricts the penetration of roots and the movement of water and air. The surface layer is strongly acid to neutral, depending on the amount of lime applied. Runoff is slow, and wetness early in spring is a limitation. The major needs in management are improvement and maintenance of organic-matter content and fertility and control of wetness. These soils are somewhat droughty in years when rainfall is below normal or poorly distributed, and occasionally crop damage results.

These soils are suited to corn, soybeans, small grain, and hay and pasture plants. They are not well suited to alfalfa because the penetration of roots is restricted by the fragipan and the soil is wet early in spring. Use of crop residue and green-manure crops helps to improve and maintain organic-matter content and fertility. A suitable drainage system allows earlier planting of crops in spring.

CAPABILITY UNIT IIw-7

This unit consists of deep, nearly level soils of the Stendal and Wakeland series. These are somewhat poorly drained, medium-textured soils on bottom lands along streams.

Organic-matter content is moderate in the Stendal soil and low in the Wakeland soil. Natural fertility is low in the Stendal soil and moderate in the Wakeland soil. These soils have a very high available water capacity and moderate permeability. The surface layer of these soils is very strongly acid to neutral, depending on the amount of lime applied. Wetness is a limitation, and flooding is a hazard. These soils are subject to sedimentation if they are flooded. Management needs are improvement and maintenance of organic-matter content and fertility, as well as control of wetness.

These soils are suited to corn and soybeans if a suitable drainage system is established and maintained. Small grain and alfalfa are subject to severe damage during periods of prolonged flooding. Use of crop residue and green-manure crops helps to improve and maintain organic-matter content. Delayed planting of crops in spring after the period when flooding is normally a hazard helps to avoid damage or loss from flooding.

CAPABILITY UNIT IIIe-1

This unit consists of deep, moderately sloping, eroded soils of the Miami and Parke series. These are well-drained, medium-textured soils. The Miami soil is on hillsides on uplands, and the Parke soil is on broad ridges and hillsides on outwash plains.

These soils are moderate in organic-matter content and low in natural fertility. They have high available water capacity and moderate permeability. The surface layer of these soils is strongly acid to neutral, depending on the amount of lime applied. Runoff and erosion are the major hazards. The major needs in management are maintenance of organic-matter content and fertility, improvement and maintenance of good soil tilth, and control of erosion.

These soils are suited to corn, soybeans, and small grain if a system for controlling erosion is established and maintained. They are suited to grasses and legumes for pasture and are especially suited to alfalfa. Minimum tillage, contour farming, stripcropping, diversion terraces, winter cover crops, and grassed waterways help to control erosion and runoff. Use of crop residue

and green-manure crops helps to control erosion and to improve and maintain organic-matter content, fertility and tilth.

CAPABILITY UNIT IIIe-3

This unit consists of deep, moderately sloping, eroded soils of the Elkinsville and Grayford series. These are well-drained, medium-textured soils on terraces and uplands.

These soils are moderate in organic-matter and low in natural fertility. They have high available water capacity and moderate permeability. The surface layer of these soils is strongly acid to neutral, depending on the amount of lime applied. Runoff and erosion are the major hazards. The major needs in management are maintenance of organic-matter content and fertility, improvement and maintenance of good soil tilth, and control of erosion.

These soils are suited to corn, soybeans, and small grain if a suitable system for controlling erosion is established and maintained. They are suited to grasses and legumes for forage and especially suited to alfalfa. Minimum tillage, contour farming, stripcropping, diversion terraces, winter cover crops, and grassed waterways help to control erosion and runoff. Use of crop residue and green-manure crops helps to control erosion and to improve and maintain organic-matter content, fertility, and tilth.

CAPABILITY UNIT IIIe-7

This unit consists of soils of the Cincinnati, Jennings, Pekin, and Rossmoyne series. These are deep, medium-textured soils that have a fragipan. The Pekin soil is on terraces, and the other soils are on uplands. The Rossmoyne soils are gently sloping and severely eroded, but the other soils are moderately sloping and eroded. The Cincinnati and Jennings soils are well drained, but the Pekin and Rossmoyne soils are moderately well drained.

Organic matter content is moderate in the Jennings soil but low in the other soils. The available water capacity is very high, and permeability is very slow. Natural fertility is low. The surface layer of these soils is very strongly acid to neutral, depending on the amount of lime applied. Erosion and runoff are hazards. The major needs in management are maintenance of organic-matter content and fertility, improvement and maintenance of good soil tilth, and control of erosion.

These soils are suited to corn, soybeans, and small grain if a suitable system for controlling erosion is established and maintained. They are suited to grasses and legumes for forage and especially suited to alfalfa. Minimum tillage, contour farming, stripcropping, diversion terraces, winter cover crops, and grassed waterways help to control erosion and runoff. Use of crop residue and green-manure crops helps to control erosion and to improve and maintain organic-matter content, fertility, and tilth.

CAPABILITY UNIT IIIw-10

Bonnie silt loam is the only soil in this unit. It is a deep, poorly to very poorly drained, medium-textured soil. It is in low, broad areas, or in slightly depressional areas on bottom lands, adjacent to higher terraces or uplands.

This soil is low in organic-matter content and natural fertility. It has very high available water capacity and slow permeability. The surface layer is strongly acid or very strongly acid, depending on the amount of lime applied. Runoff is slow to ponded, and wetness is the major limitation. Flooding that occurs in winter and spring is the main hazard. The management needs are improvement and maintenance of organic-matter content and fertility, and control of wetness.

This soil is suited to pasture or woodland. If drainage is adequate, it is suited to corn and soybeans. Use of crop residue and green-manure crops helps to improve and maintain organic-matter content and fertility.

CAPABILITY UNIT IIIw-12

This unit consists of deep, nearly level, poorly drained soils of the Clermont and Peoga series. These are medium-textured soils that have a fragipan. The Clermont soil is in broad areas of uplands, and the Peoga soil is in broad areas of terraces adjacent to uplands.

These soils are low in organic-matter content and natural fertility. They have moderate available water capacity. Permeability is very slow in the Clermont soil and slow in the Peoga soil. The fragipan in the subsoil restricts the penetration of roots and the movement of water and air. The surface layer of these soils is strongly acid to neutral, depending on the amount of lime applied. Runoff is slow, and wetness is the major limitation. Management needs are improvement and maintenance of organic-matter content and fertility and control of wetness.

These soils are suited to corn and soybeans if a suitable drainage system is established and maintained. They are not well suited to alfalfa because wetness is prolonged and the development of roots restricted. Use of crop residue and green-manure crops helps to improve and maintain organic-matter content and fertility.

CAPABILITY UNIT IVe-1

This unit consists of deep, moderately sloping and strongly sloping, eroded and severely eroded, well-drained soils of the Miami and Parke series. The moderately sloping severely eroded Miami soil is moderately fine textured, but the other soils are medium textured. The Miami soils are on uplands, and the Parke soils are on outwash plains.

Organic-matter content is moderate in the eroded soil but low in the severely eroded soils. The natural fertility is low. These soils have high available water capacity and moderate permeability. The surface layer of these soils is strongly acid to neutral, depending on the amount of lime applied. Erosion and runoff are the major hazards. The major needs in management are maintenance of organic-matter content and fertility, improvement and maintenance of good soil tilth, and control of erosion.

These soils are suited to small grain, grasses, and legumes for forage, and they are especially suited to alfalfa. Use of crop residue and green-manure crops helps to control erosion, improve and maintain organic-matter content and fertility, and improve tilth. Mini-

mum tillage, contour farming, stripcropping, diversion terraces, and grassed waterways help to control runoff and erosion.

CAPABILITY UNIT IVe-3

This unit consists of deep, moderately sloping and strongly sloping, eroded and severely eroded soils of the Grayford series. These are well-drained, medium-textured soils on uplands.

Organic-matter content is moderate in the eroded soil and low in the severely eroded soil. Both soils are low in natural fertility. They have high available water capacity and moderate permeability. The surface layer of these soils is strongly acid to neutral, depending on the amount of lime applied. Erosion and runoff are the major hazards. The major needs in management are maintenance of organic-matter content and fertility, improvement and maintenance of good soil tilth, and control of erosion.

These soils are suited to small grain and grasses and legumes for forage, and they are especially suited to alfalfa. Use of crop residue and green-manure crops helps to control erosion, improve and maintain organic-matter content and fertility, and improve tilth. Minimum tillage, contour farming, stripcropping, diversion terraces, and grassed waterways help to control erosion and runoff.

CAPABILITY UNIT IVe-7

This unit consists of deep, moderately sloping and strongly sloping, eroded and severely eroded soils of the Cincinnati and Jennings series. These are well-drained, medium-textured soils that have a fragipan. They are on uplands.

These soils are low in organic-matter content and natural fertility, but the strongly sloping, eroded Jennings soil is moderate. They have moderate available water capacity and very slow permeability. The surface layer of these soils is acid to neutral, depending on the amount of lime applied. Erosion and runoff are the major hazards. The major needs in management are maintenance of organic-matter content and fertility, improvement and maintenance of good soil tilth, and control of erosion.

These soils are suited to small grain and to grasses and legumes for forage. Use of crop residue and green-manure crops helps to control erosion, improve and maintain organic-matter content and fertility, and improve tilth. Minimum tillage, contour farming, stripcropping, diversion terraces, and grassed waterways help to control erosion and runoff.

CAPABILITY UNIT IVe-8

Trappist silt loam, 6 to 12 percent slopes, eroded, is the only soil in this unit. It is a moderately deep, well-drained, medium-textured soil on narrow ridges and broad hillsides of the uplands.

This soil is moderate in organic-matter content and low in natural fertility. It has moderate available water capacity and slow permeability. The surface layer is strongly acid to neutral, depending on the amount of lime applied. Erosion and runoff are the major hazards. The major needs in management are maintenance of organic-matter content and fertility, improvement and maintenance of good soil tilth, and control of erosion.

This soil is suited to small grain and to grasses and legumes for forage. Use of crop residue and green-manure crops helps to control erosion, improve and maintain organic-matter content and fertility, and improve tilth. Minimum tillage, contour farming, stripcropping, diversion terraces, and grassed waterways help to control erosion and runoff.

CAPABILITY UNIT VIe-1

This unit consists of deep, moderately deep, and shallow soils of the Cincinnati, Grayford, Corydon, Hickory, Jennings, and Trappist series. These soils are moderately sloping to very steep and are slightly to severely eroded. They are well-drained, medium-textured and moderately fine textured soils of the uplands.

These soils are low or moderate in organic-matter content and natural fertility. They have very low to high available water capacity and very slow to moderate permeability. The surface layer of these soils is very strongly acid to neutral, depending on the amount of lime applied. The Cincinnati and Jennings soils have a fragipan that restricts the penetration of roots and the movement of water and air in the subsoil. Erosion and runoff are the major hazards. The major needs in management are maintenance of good soil tilth and control of erosion.

These soils are suited to hay, permanent pasture, or trees. A permanent vegetative cover helps to control erosion and runoff. Contour farming and minimum tillage when preparing the seedbed to establish permanent pasture help to control erosion and runoff.

CAPABILITY UNIT VIIe-1

This unit consists of well-drained soils of the Hickory and Trappist series and Gullied land. These are medium-textured and moderately fine textured soils on uplands. The Hickory soil is deep and steep to very steep, and the Trappist soil is moderately deep, strongly sloping, and severely eroded.

Organic-matter content is moderate in the Hickory soil but low in the other soils. Natural fertility is low. The available water capacity is high in the Hickory soil but low or moderate in the other soils. Permeability is slow or moderate. The surface layer of these soils is very strongly acid to neutral, depending on the amount of lime applied. Surface runoff is medium to very rapid. Erosion and runoff are the major hazards. Maintenance of a permanent cover of trees or grasses helps to control runoff and erosion. Areas suited to pasture should not be overgrazed.

These soils are not suited to cultivation, but are suited to selected hardwood and evergreen trees or permanent pasture. Well-established native grasses grow well enough to provide limited grazing.

CAPABILITY UNIT VIIe-2

This unit consists of shallow, moderately steep to very steep soils of the Corydon and Weikert series. These are well-drained, medium-textured soils that are stony or shaly and are on uplands.

These soils are moderate in organic-matter content. The Corydon soil is moderate in natural fertility, and the Weikert soil is low. Both soils have low or very low available water capacity. Permeability is moderately slow in the Corydon soil and moderately rapid

in the Weikert soil. The surface layer of the Corydon soil is slightly acid to neutral, and that of the Weikert soil is strongly acid to very strongly acid. Surface runoff is very rapid. Erosion and runoff are major hazards in use and management. Maintaining a permanent cover of trees or grass helps to control runoff and erosion. Areas suited to pasture should not be overgrazed.

These soils are not suited to cultivation, but they are suited to selected hardwood and evergreen trees or to permanent pasture. Well-established native grasses grow well enough to provide limited grazing.

Predicted yields

The average yields per acre of the principal crops under a high level of management are shown for each soil in table 2.

The following are assumed to be part of a high-level management system:

1. Using cropping systems that maintain tilth and organic-matter content.
2. Controlling erosion to the maximum extent feasible, so that the quality of the soil is maintained or improved rather than reduced.
3. Maintaining a high level of fertility by means of frequent soil tests and use of fertilizer in accordance with recommendations of Purdue University Agricultural Experiment Station.
4. Liming the soils in accordance with the results of soil tests.
5. Using crop residue to the fullest extent practicable to protect and improve the soil.
6. Using minimum tillage practices, where needed, because of the hazards of soil compaction and erosion.
7. Using only the crop varieties that are best adapted to the climate and the soil.
8. Controlling weeds carefully by tillage and spraying.
9. Draining wet areas well enough so that wetness does not restrict yields of adapted crops.

TABLE 2.—*Predicted average acre yields of specified crops under a high level of management*

[The land type, Gullied land (Gu), is not listed in this table. Dashes indicate the soil is not suitable for the crop specified]

Soil	Corn	Wheat	Soybeans	Legume-grass hay	Pasture
	Bu	*Bu*	*Bu*	*Tons*	*Animal-unit-months*[1]
Avonburg silt loam, 0 to 2 percent slopes	110	50	38	3.6	7.2
Avonburg silt loam, 2 to 4 percent slopes, eroded	100	45	35	3.3	6.6
Bartle silt loam	110	50	38	3.6	7.2
Bonnie silt loam	130	52	46	4.3	8.6
Brookston silty clay loam	145	65	51	4.8	9.6
Cincinnati silt loam, 2 to 6 percent slopes, eroded	95	43	33	3.1	6.2
Cincinnati silt loam, 6 to 12 percent slopes, eroded	85	38	30	2.8	5.6
Cincinnati silt loam, 6 to 12 percent slopes, severely eroded	75	34	26	2.5	5.0
Cincinnati silt loam, 12 to 18 percent slopes, eroded	–	32	24	2.3	4.6
Cincinnati silt loam, 12 to 18 percent slopes, severely eroded	–	–	–	2.0	4.0
Cincinnati-Rossmoyne silt loams, 4 to 10 percent slopes, eroded	85	38	30	2.8	5.6
Clermont silt loam	125	56	44	4.1	8.2
Corydon stony silt loam, 25 to 40 percent slopes	–	–	–	–	.1
Eel silt loam	120	48	42	4.0	8.0
Elkinsville silt loam, 0 to 2 percent slopes	120	48	42	4.0	8.0
Elkinsville silt loam 2 to 6 percent slopes, eroded	115	46	40	3.8	7.6
Elkinsville silt loam, 6 to 12 percent slopes, eroded	105	42	37	3.4	6.3
Fincastle silt loam, 0 to 3 percent slopes	130	52	46	4.3	8.6
Fincastle-Russell silt loams, 2 to 6 percent slopes, eroded	130	52	46	4.3	8.6
Genesee loam	120	48	42	4.0	8.0
Grayford silt loam, 2 to 6 percent slopes, eroded	115	46	40	3.8	7.6
Grayford silt loam, 6 to 12 percent slopes, eroded	105	42	37	3.4	6.8
Grayford silt loam, 6 to 12 percent slopes, severely eroded	100	40	35	3.3	6.6
Grayford silt loam, 12 to 18 percent slopes, eroded	90	36	32	3.0	6.0
Grayford silt loam, 12 to 18 percent slopes, severely eroded	–	34	–	2.8	5.6
Grayford-Corydon soils 18 to 25 percent slopes, eroded	–	–	–	2.5	5.0
Haymond silt loam	125	50	44	4.1	8.2
Hickory loam, 18 to 25 percent slopes, eroded	–	–	–	2.1	4.2
Hickory loam, 25 to 50 percent slopes	–	–	–	1.6	3.2
Jennings silt loam, 2 to 6 percent slopes, eroded	85	38	30	2.8	5.6
Jennings silt loam, 6 to 12 percent slopes, eroded	75	34	26	2.5	5.0
Jennings silt loam, 6 to 12 percent slopes, severely eroded	65	29	23	2.1	4.2
Jennings silt loam, 12 to 18 percent slopes, eroded	60	27	21	2.0	4.0

TABLE 2.—*Predicted average acre yields of specified crops under a high level of management*—*Continued*

Soil	Corn	Wheat	Soybeans	Legume-grass hay	Pasture
	Bu	*Bu*	*Bu*	*Tons*	*Animal-unit-months*[1]
Jennings silt loam, 12 to 18 percent slopes, severely eroded	–	22	–	1.6	3.2
Miami silt loam, 6 to 12 percent slopes, eroded	95	43	33	3.1	6.2
Miami silt loam, 12 to 18 percent slopes, eroded	80	36	28	2.6	5.2
Miami clay loam, 6 to 12 percent slopes, severely eroded	90	40	32	3.0	6.0
Parke silt loam, 2 to 6 percent slopes, eroded	115	46	40	3.8	7.6
Parke silt loam, 6 to 12 percent slopes, eroded	105	42	37	3.4	6.8
Parke silt loam, 6 to 12 percent slopes, severely eroded	100	40	35	3.3	6.6
Pekin silt loam, 0 to 2 percent slopes	105	47	37	3.4	6.8
Pekin silt loam, 2 to 6 percent slopes, eroded	95	43	33	3.1	6.2
Pekin silt loam, 6 to 10 percent slopes, eroded	85	38	30	2.8	5.6
Peoga silt loam	125	50	44	4.1	8.2
Rossmoyne silt loam, 0 to 2 percent slopes	105	47	37	3.4	6.8
Rossmoyne silt loam, 2 to 6 percent slopes, eroded	95	43	33	3.1	6.2
Rossmoyne silt loam, 2 to 6 percent slopes, severely eroded	85	38	30	2.8	5.6
Steff silt loam	120	48	42	4.0	8.0
Stendal silt loam	130	52	46	4.3	8.6
Trappist silt loam, 6 to 12 percent slopes, eroded	50	22	18	1.6	3.2
Trappist silt loam, 12 to 18 percent slopes, eroded	–	16	–	1.2	2.4
Trappist silty clay loam, 6 to 12 percent slopes, severely eroded	–	18	–	1.3	2.6
Trappist silty clay loam, 12 to 18 percent slopes, severely eroded	–	11	–	.8	1.6
Wakeland silt loam	135	54	47	4.4	8.8
Weikert shaly silt loam, 18 to 40 percent slopes, eroded	–	–	–	–	.6
Wilbur silt loam	125	50	44	4.1	8.2

[1] Animal-unit-month is a term used to express the carrying capacity of pasture. It is the number of animals carried per acre multiplied by the number of months the pasture can be grazed during a single grazing season without injury to the sod. For example, an acre of pasture that provides 2 months of grazing for 5 cows has a carrying capacity of 10 animal-unit-months.

The yields shown in table 2 are estimated averages for a period of 5 to 10 years. They are based on farm records; on interviews with farmers, members of the Purdue Agricultural Experiment Station, and area extension agents; and on direct observations by soil scientists and soil conservationists. Considered in making the estimates were the prevailing climate, the characteristics of the soils, and the influence of a high level of management on the soils.

It should be understood that these yield figures are not intended to apply directly to specific tracts of land for any particular year, because the soils differ somewhat from place to place, management practices differ from farm to farm, and weather varies from year to year. Nevertheless, these estimates appear to be as accurate a guide as can be obtained without detailed and lengthy investigation. They are useful in showing the relative productivity of soils under a high level of management.

Woodland[2]

Hardwood forest originally covered most of Jennings County. In 1969, about 38,711 acres was woodland. Much of the present forest is in moderately steep to very steep soils of the uplands. Many small tracts are on nearly level, poorly drained and somewhat poorly drained soils. The soils differ greatly in their suitability for trees. Productivity is affected by such things as available water capacity, depth of the rooting zone, thickness of the surface layer, texture, consistence, aeration, natural fertility, and depth to the water table. Upland oaks, tulip-poplar, pin oak, and sweetgum are the principal wood crops in Jennings County.

Upland oaks are predominant on the well-drained sites. Among the soils that are well suited to upland oaks and associated trees are those of the Cincinnati series. White oak, red oak, black oak, chinquapin oak, hickory, white ash, sugar maple, and tulip-poplar are dominant. Because the demand for black walnut has increased, black walnut has been planted on some deep, well-drained soils. In recent years, special attention has also been given to the management of existing stands of black walnut.

Tulip-poplar generally grows on well-drained soils on the lower part of steep slopes, on cool aspects (north and northeast slopes), and in coves. Among the soils that are well suited to tulip-poplar and associated trees are those of the Hickory series. Among the associated trees are white ash, red oak, basswood, white oak, hickory, beech, black walnut, and sugar maple. Tulip-poplar is the species to be preferred in management.

Pin oak grows on poorly drained and somewhat poorly drained soils on uplands, terraces, and bottom

[2] By JOHN O. HOLWAGER, woodland conservationist, Soil Conservation Service.

lands. Among the soils that are well suited to pin oak and associated trees are those of the Clermont series. Among the associated trees are soft maple, sweetgum, swamp white oak, elm, ash, and beech.

Sweetgum is a major forest type on poorly drained soils on uplands and terraces and on poorly drained and somewhat poorly drained soils on bottom lands. Among the soils that are well suited to sweetgum and associated trees are those of the Stendal series. Among the associated trees are river birch, hickory, ash, and sycamore. Sweetgum is a minor component of several timber types.

Woodland suitability groups

To assist woodland owners in planning the use of their soils, the soils of this county have been placed in 11 woodland suitability groups that are listed in table 3. Each woodland group is made up of soils that have similar characteristics that affect the growth of trees. Table 3 gives the average site index for specified trees for each suitability group, and the degree to which specified hazards and limitations affect the management of each group, and the species to favor in natural stands and for planting. The groups are not numbered consecutively, because not all the units in the statewide system are represented in Jennings County. The woodland suitability group for each soil is given in the "Guide to Mapping Units" at the back of the survey.

The site indexes for upland oaks, tulip-poplar, pin oak, and sweetgum are given for each group of soils on which these trees grow. Site index is the average height of the dominant trees in a stand at 50 years of age. For example, a site index of 80 for uplands oaks means that these trees, which are dominant on a given site, can be expected to average 80 feet in height when they are 50 years old. The height-growth data for determining the site indexes for upland oaks were obtained from the United States Department of Agriculture Technical Bulletin 560 (*7*); for tulip-poplar, from unpublished data assembled for the Forest Service in 1957; and for pin oak and sweetgum, from age-height data given in the Forestry Handbook (*9*). The site indexes can be converted to growth and yield data by using methods that are shown in Technical Bulletin 560 as they were adapted by Case, Gingrich, and Lloyd in 1962 and the methods in Agricultural Handbook 181 (*6*) as they were adapted by Case in 1962.

Seedling mortality refers to the expected loss of natural or planted seedlings attributable to the characteristics of the soils, the hazards of erosion, and the direction of slope. Mortality is slight if natural regeneration is ordinarily adequate for restocking. It is moderate if natural regeneration cannot always be relied upon for adequate and immediate restocking. Mortality is severe if considerable replanting, special preparation of seedbed, and use of superior planting techniques are required to insure satisfactory stands.

Erosion hazard refers to the potential hazard of soil losses in woodland. Slight indicates that erosion control is unimportant. Moderate indicates that some attention must be given to control unnecessary soil erosion. Severe indicates that intensive treatments, specialized equipment, and methods of operation must be used to minimize soil erosion.

Windthrow hazard is related to soil characteristics that affect development of tree roots and resistance to uprooting. The hazard is slight if individual trees can be expected to remain when released on all sides; moderate if development of roots is adequate for stability except during periods of excessive soil wetness or high wind; and severe if development of roots is not adequate for stability and individual trees can be expected to blow over if released on all sides.

Equipment limitation is based on soil characteristics that restrict or prohibit the use of equipment commonly used for tending and harvesting the woodland crop. The limitation is slight if there is no restriction on the kind of equipment used or on the time of year that it can be used. It is moderate if there is a seasonal restriction of less than 3 months or if there is a moderate restriction caused by slope, wetness, stoniness, or other physical characteristics. The limitation is severe if there is a seasonal restriction of more than 3 months when equipment cannot be used or if there are other severe restrictions caused by steepness, wetness, stoniness, or numerous gullies.

The tree species to favor in natural stands are those that have the most rapid growth rate combined with the highest value and marketability.

The tree species to favor for planting are listed in order of preference, but this is not a complete list of suitable trees.

Trees and shrubs for environmental improvement

The soils of Jennings County have been placed in four broad groups to give landowners a good basis for planning the use of trees and shrubs for environmental improvement. Table 4 shows these groups and lists some of the trees and shrubs that grow naturally on each soil group. These trees and shrubs should be retained when the area is developed for more intensive use. The table also lists many trees and shrubs that are suitable for planting in a wide variety of environmental improvement projects. No attempt has been made to list all the plants that grow or that are suited to the various soils. To learn which group a soil is in refer to the "Guide to Mapping Units" at the back of this survey.

For further assistance, local landscape architects, commercial nurseries, or forestry specialists can give information on arranging plants, sources of plants, and use of other materials suited to the various sites.

In addition to providing wood crops, the tree-covered tracts in the county should be evaluated for their community benefits. Among the benefits that have long-time value are the following:

1. Wind protection.—Scattered trees and wooded tracts tend to break up the regular wind pattern and reduce velocity.
2. Wildlife habitat.—Islands of woody cover are essential if songbirds and all forms of wildlife are to exist and reproduce.
3. Erosion control.—Tree cover is excellent for erosion control and in many places serves as a filter strip for the streams and reservoirs of the county.

TABLE 3.—*Suitability of*

[Dashed lines indicate that the species

Woodland suitability group, soil series, and map symbols	Site index [1]			
	Upland oaks	Tulip-poplar	Pin oak	Sweet-gum
Group 1: Deep, well-drained nearly level to strongly sloping soils that have high available water capacity. Elkinsville: ElA, ElB2, ElC2. Grayford: GfB2, GfC2, GfC3, GfD2, GfD3, GoE2. Miami: MmC2, MmD2, MoC3. Parke: PaB2, PaC2, PaC3.	85–95	95–105	------	70–80
Group 2. Deep, well-drained, moderately steep to very steep soils that have high available water capacity. Hickory: HkE2, HkF.	85–95	95–105	------	------
Group 5: Deep, somewhat poorly drained, nearly level and gently sloping soils that have moderate and high available water capacity. Avonburg: AvA, AvB2. Bartle: Ba. Fincastle: FcA, FrB2.	80–90	90–100	85–100	75–85
Group 7: Shallow, well-drained, steep to very steep soils that have very low available water capacity. Corydon: CyF.	65–75	80–90	------	------
Group 8: Deep, well drained and moderately well drained nearly level soils that have high or very high available water capacity and are subject to flooding. Eel: Ee. Genesse: Ge. Haymond: Ha. Steff: St. Wilbur: Wu.	------	95–105	------	95–105
Group 9: Deep, well drained and moderately well drained, nearly level to strongly sloping soils that have moderate available water capacity and a very slowly permeable fragipan. Cincinnati: CnB2, CnC2, CnC3, CnD2, CnD3, CoC2. Jennings: JnB2, JnC2, JnC3, JnD2, JnD3. Pekin: PcA, PcB2, PcC2. Rossmoyne: RsA, RsB2, RsB3.	70–85	90–100	------	80–85
Group 10: Moderately deep, well-drained, moderately sloping and strongly sloping soils that have moderate available water capacity. Trappist: TrC2, TrD2, TsC3, TsD3.				
North-facing slopes	75–85	90–100	------	------
South-facing slopes	65–75	------	------	------
Group 11: Deep, poorly drained and very poorly drained, nearly level or slightly depressional soils that have moderate, high, or very high available water capacity and are subject to flooding. Bonnie: Bo. Brookston: Br. Clermont: Cr. Peoga: Pe.	95–105	90–105	85–105	85–95
Group 13: Deep, somewhat poorly drained, nearly level soils that have high available water capacity and are subject to flooding. Stendal: Sx. Wakeland: Wa.	------	------	90–105	85–95
Group 14: Severely gullied areas where the gullies are 3 to 8 feet or more in depth; variable characteristics within short distances. Gullied land: Gu.	------	------	------	------
Group 22: Shallow, well-drained, moderately steep to very steep soils that have low available water capacity. Weikert: WkE2.	45–55	------	------	------

[1] The height reached by the dominant trees in a stand at the age of 50 years.

the soils for woodland

is scarce or that data are not available]

Seedling mortality	Erosion hazard	Windthrow hazard	Equipment limitations	Species to favor —	
				In natural stands	For planting
Slight to moderate.	Slight to moderate.	Slight	Slight to moderate	Tulip-poplar, white ash, red oak, black walnut, white oak.	White pine, shortleaf pine, black locust, red pine.
Slight to moderate.	Slight to severe.	Slight	Slight to moderate: slopes are steep and short.	Tulip-poplar, white ash, red oak, black walnut, white oak.	White pine, shortleaf pine, black locust, Virginia pine, red pine.
Slight	Slight	Moderate to severe.	Moderate	Sweetgum, pin oak, soft maple, white ash, tulip-poplar, swamp white oak.	White pine, sweetgum, soft maple, sycamore.
Severe	Moderate	Moderate	Severe	Red oak, white oak, chinquapin oak, black walnut, tulip-poplar, white ash.	White pine, red pine.
Slight	Slight	Slight	Slight	Cottonwood, sycamore, tulip-poplar, black walnut, white ash, southern red oak.	White pine, cottonwood, black locust, sycamore, black walnut.
Slight	Slight to moderate.	Moderate	Slight	White oak, white ash, tulip-poplar, black oak.	White pine, red pine, shortleaf pine, Virginia pine.
Slight	Moderate	Slight to moderate.	Moderate	Tulip-poplar, white oak, red oak, white ash.	Shortleaf pine, Virginia pine, white pine.
Slight to moderate.	Moderate	Slight to moderate.	Slight to moderate	White oak, black oak, tulip-poplar, white ash.	Red pine, shortleaf pine, Virginia pine.
Moderate	Slight	Moderate to severe.	Severe	Sweetgum, pin oak, soft maple, bur oak, white ash, tulip-poplar, swamp white oak.	Planting very rarely needed.
Slight	Slight	Moderate	Moderate	Sweetgum, pin oak, soft maple, white ash, green ash.	Cottonwood, sycamore, and sweetgum.
Slight to moderate.	Severe	Moderate	Severe	Few, if any, existing stands; planting mainly to control erosion.	Shortleaf pine, Virginia pine, loblolly pine, and white pine.
Moderate to severe.	Moderate	Moderate to severe.	Moderate to severe	Chestnut oak, white oak, and Virginia pine.	White pine, shortleaf pine, black locust.

TABLE 4.—*Tree and shrub guide*

Tree and shrub groups, site description, and series	Trees to keep for home and park sites
Group 1: Somewhat poorly drained to very poorly drained, nearly level and depressional, silty or loamy soils that have a seasonal high water table at a depth of 0 to 3 feet; some soils subject to ponding or flooding: Bonnie, Brookston, Clermont, Peoga, Stendal, Wakeland.	Pin oak, bur oak, shingle oak, sycamore, sweetgum, river birch.
Group 2: Well-drained to somewhat poorly drained, nearly level to strongly sloping, silty or loamy soils; the somewhat poorly drained soils have a seasonal high water table at a depth of 1 to 3 feet and some have a fragipan; the moderately well drained and well drained soils have a very slowly permeable fragipan: Avonburg, Bartle, Cincinnati, Fincastle, Jennings, Pekin, Rossmoyne.	Bur oak, pin oak, white oak, scarlet oak, sugar maple, blackgum, tulip-poplar.
Group 3: Well drained and moderately well drained, level to very steep, silty and loamy soils; the moderately well drained soils have a seasonal high water table at a depth of 3 to 6 feet; well drained soils have a water table below a depth of 6 feet; some soils are subject to flooding: Eel, Elkinsville, Genessee, Grayford, Haymond, Hickory, Miami, Parke, Russell, Steff, Wilbur.	Red oak, white oak, black walnut, tulip-poplar, sugar maple, sycamore, hackberry.
Group 4: Well drained, moderately sloping to very steep, shallow and moderately deep soils that have very low or moderate available water capacity; included is a land type: Corydon, Gullied land, Trappist, Weikert.	Sycamore, river birch, ash, red oak ______

4. Recreation and education.—Wooded areas provide already developed sites for county parks, outdoor laboratories for schools, and nature areas.
5. Air pollution reduction.—The role of trees in the reduction of air pollution is recognized more each year. Trees release moisture and oxygen into the atmosphere and have a cooling and purifying effect.
6. Environmental improvement.—All wooded tracts add scenic beauty to the county and help create both a healthful and a better environment for people.

Wildlife

This section discusses suitability of soils in Jennings County for wildlife habitats. The soil characteristics evaluated are depth to bedrock, erosion, flooding or ponding, permeability, stoniness, slope, texture, reaction, wetness, depth to seasonal high water table, and available water capacity. Not considered are size, shape, and pattern of soil areas. The ability of wildlife to move from place to place is also not considered.

This interpretative information should prove helpful to those responsible for and making decisions about wildlife habitat management. The suitability ratings given in table 5 help in the selection of sites for habitat management and indicate the intensity of management needed to produce satisfactory results. They also serve to group the known soil conditions so that the broad-scale planning, acquisition, and development of land for wildlife habitats can take place. Landowners can use these ratings in conjunction with the soil map in deciding where the management practices for a desired wildlife habitat are best applied and in selecting the practices to be used. These ratings may also be useful in showing that the development of a habitat for a particular species of wildlife is not feasible. They should not be applied to the use of soil for farms, woodland, and other purposes.

Table 5 shows the suitability of soils in Jennings County for producing eight elements of wildlife habitat and three kinds of wildlife. The suitability is expressed in terms of good, fair, poor, and very poor. *Good* indicates that habitats are generally easily created, improved, or maintained and that there are few or no soil limitations that affect management. *Fair* indicates that habitats generally can be created, improved, or maintained, but there are moderate soil limitations that affect management. *Poor* indicates that habitats can generally be created, improved, or maintained, but there are rather severe soil limitations. *Very poor* indicates that it is questionable whether habitats can be created, improved, or maintained, and that habitats may not be practical.

Grain and seed crops refer to domestic grains or, annual herbaceous plants that produce seed crops used for food by wildlife. Examples of these crops are corn, sorghum, wheat, oats, soybeans, millets, buckwheat, and sunflowers (fig. 13).

Grasses and legumes refer to domestic perennial grasses and herbaceous legumes that are established by planting and furnish wildlife cover and food. Examples of these crops are fescue, brome, timothy, redtop, orchardgrass, reed canarygrass, clovers, trefoils, alfalfa, sericea lespedeza, and crown vetch.

Wild herbaceous upland plants are native or introduced perennial grasses and weeds that provide food and cover principally to upland forms of wildlife and are established mainly through natural processes. Examples of these plants are bluestem, wild rye, ragweed, lespedeza, goldenrod, and foxtail.

Hardwood woody plants are deciduous trees, shrubs, and woody vines that produce fruits, nuts, buds, and twigs of foliage used extensively as food by wildlife. These plants are commonly established through natural processes, but they also may be planted. Examples of these plants are oaks, beech, cherries, hawthorns, dogwoods, maples, birches, poplars, blueberries, greenbriers, roses, and viburnums.

for environmental improvement

Trees and shrubs for —		
Plantings for windbreaks, screens, and sound barriers	Plantings for beauty and shade	Plantings to attract songbirds and wildlife
White pine, Norway spruce, American arborvitae, Lombardy poplar, gray dogwood, silky dogwood, laurelleaf willow, tall purple willow, medium purple willow.	White pine, white spruce, baldcypress, sycamore, sweetgum, pin oak.	American arborvitae, black spruce, gray dogwood, redosier dogwood, silky dogwood, elderberry, Amur honeysuckle, buttonbush.
White pine, Norway spruce, white spruce, hemlock, autumn-olive, Amur honeysuckle, highbushcranberry, blackhaw, serviceberry, rose-of-Sharon.	White pine, white spruce, baldcypress, basswood, cornelian cherry, cutleaf sumac.	White spruce, autumn-olive, Amur honeysuckle, highbushcranberry, spicebush, blackhaw, mapleleaf viburnum, serviceberry, cutleaf sumac.
White pine, red pine, Norway spruce, hemlock, autumn-olive.	White pine, red pine, Norway spruce, tulip-poplar, blackgum, honeylocust (thornless), mountain ash, Norway maple, flowering dogwood, basswood, redbud, white birch.	Hemlock, black locust, mountain ash, flowering dogwood, basswood, redbud, autumn-olive, Amur honeysuckle, blackhaw, serviceberry, hawthorne.
Red pine, white pine, autumn-olive, blackhaw, hazelnut, forsythia, lilacs (var.), staghorn sumac, flowering quince.	Red pine, white pine, scarlet oak, honeylocust (thornless), Russian olive.	Virginia pine, Austrian pine, autumn-olive, blackhaw, serviceberry, hazelnut, staghorn sumac, flowering dogwood.

Figure 13. **— Sunflowers growing on narrow bottom lands. The soil is Haymond silt loam.**

TABLE 5.—*Suitability of the soils for elements*

Soil series and map symbols	Wildlife habitat elements			
	Grain and seed crops	Grasses and legumes	Wild herbaceous upland plants	Hardwood woody plants
Avonburg:				
AvA	Fair	Fair	Good	Good
AvB2	Fair	Fair	Good	Good
Bartle: Ba	Fair	Fair	Good	Good
Bonnie: Bo	Poor	Fair	Fair	Good
Brookston: Br	Very poor	Poor	Poor	Good
Cincinnati:				
CnB2	Good	Good	Good	Good
CnC2, CnC3	Fair	Good	Good	Good
CnD2, CnD3	Poor	Fair	Good	Good
CoC2	Fair	Good	Good	Good
Clermont: Cr	Poor	Fair	Fair	Good
Corydon: CyF	Very poor	Poor	Good	Good
Eel: Ee	Fair	Good	Good	Good
Elkinsville:				
ElA, ElB2	Good	Good	Good	Good
ElC2	Fair	Good	Good	Good
Fincastle:				
FcA	Fair	Fair	Good	Good
FrB2	Fair	Fair	Good	Good
Genesee: Ge	Fair	Good	Good	Good
Grayford:				
GfB2	Good	Good	Good	Good
GfC2, GfC3	Fair	Good	Good	Good
GfD2, GfD3	Poor	Fair	Good	Good
GoE2	Very poor	Fair	Good	Good
Gullied land: Gu. Too variable for reliable estimates to be made.				
Haymond: Ha	Fair	Good	Good	Good
Hickory: HkE2, HkF	Very poor	Fair	Good	Good
Jennings:				
JnB2	Good	Good	Good	Good
JnC2, JnC3	Fair	Good	Good	Good
JnD2, JnD3	Poor	Fair	Good	Good
Miami:				
MmC2	Fair	Good	Good	Good
MmD2	Poor	Fair	Good	Good
MoC3	Fair	Good	Good	Good
Parke:				
PaB2	Good	Good	Good	Good
PaC2, PaC3	Fair	Good	Good	Good
Pekin:				
PcA	Good	Good	Good	Good
PcB2	Good	Good	Good	Good
PcC2	Fair	Good	Good	Good
Peoga: Pe	Poor	Fair	Fair	Good
Rossmoyne:				
RsA	Good	Good	Good	Good
RsB2	Good	Good	Good	Good
RsB3	Good	Good	Good	Good
Steff: St	Fair	Fair	Good	Good
Stendal: Sx	Poor	Fair	Fair	Good
Trappist:				
TrC2, TsC3	Fair	Good	Good	Good
TrD2, TsD3	Poor	Fair	Good	Good
Wakeland: Wa	Fair	Fair	Good	Good
Weikert: WkE2	Very poor	Poor	Good	Good
Wilbur: Wu	Fair	Fair	Good	Good

of wildlife habitat and for kinds of wildlife

Wildlife habitat elements—*Continued*				Kinds of wildlife		
Coniferous woody plants	Wetland food and cover plants	Shallow water developments	Ponds	Openland	Woodland	Wetland
Poor	Fair	Fair	Fair	Good	Fair	Fair.
Poor	Poor	Poor	Poor	Good	Fair	Poor.
Poor	Fair	Fair	Fair	Good	Fair	Fair.
Fair	Fair	Fair	Very poor	Fair	Good	Fair.
Good	Good	Good	Good	Poor	Good	Good.
Poor	Very poor	Very poor	Very poor	Good	Good	Very poor.
Poor	Very poor	Very poor	Very poor	Good	Good	Very poor.
Poor	Very poor	Very poor	Very poor	Fair	Fair	Very poor.
Poor	Very poor	Very poor	Very poor	Good	Good	Very poor.
Fair	Good	Good	Good	Fair	Good	Good.
Fair	Very poor	Very poor	Very poor	Poor	Good	Very poor.
Poor	Very poor	Poor	Poor	Good	Good	Very poor.
Poor	Very poor	Very poor	Very poor	Good	Good	Very poor.
Poor	Very poor	Very poor	Very poor	Good	Good	Very poor.
Poor	Fair	Fair	Fair	Good	Good	Fair.
Poor	Poor	Poor	Poor	Good	Fair	Poor.
Poor	Poor	Poor	Very poor	Good	Good	Very poor.
Poor	Very poor	Very poor	Very poor	Good	Good	Very poor.
Poor	Very poor	Very poor	Very poor	Good	Good	Very poor.
Poor	Very poor	Very poor	Very poor	Fair	Fair	Very poor.
Poor	Very poor	Very poor	Very poor	Fair	Fair	Very poor.
Poor	Poor	Poor	Very poor	Good	Good	Very poor.
Poor	Very poor	Very poor	Very poor	Fair	Fair	Very poor.
Poor	Very poor	Very poor	Very poor	Good	Good	Very poor.
Poor	Very poor	Very poor	Very poor	Good	Good	Very poor.
Poor	Very poor	Very poor	Very poor	Fair	Fair	Very poor.
Poor	Very poor	Very poor	Very poor	Good	Good	Very poor.
Poor	Very poor	Very poor	Very poor	Fair	Fair	Very poor.
Poor	Very poor	Very poor	Very poor	Fair	Fair	Very poor.
Poor	Very poor	Very poor	Very poor	Good	Good	Very poor.
Poor	Very poor	Very poor	Very poor	Good	Good	Very poor.
Poor	Poor	Poor	Poor	Good	Good	Poor.
Poor	Very poor	Very poor	Poor	Good	Good	Very poor.
Poor	Very poor	Very poor	Very poor	Good	Good	Very poor.
Fair	Good	Good	Good	Fair	Good	Good.
Poor	Poor	Poor	Poor	Good	Good	Poor.
Poor	Very poor	Very poor	Poor	Good	Good	Very poor.
Poor	Very poor	Very poor	Poor	Good	Good	Very poor.
Poor	Poor	Fair	Fair	Good	Fair	Poor.
Poor	Fair	Fair	Very poor	Fair	Fair	Fair.
Poor	Very poor	Very poor	Very poor	Good	Good	Very poor.
Poor	Very poor	Very poor	Very poor	Fair	Fair	Very poor.
Poor	Fair	Fair	Poor	Good	Fair	Fair.
Fair	Very poor	Very poor	Very poor	Poor	Fair	Very poor.
Poor	Poor	Poor	Poor	Good	Good	Poor.

TABLE 6.—*Limitations of the soils*

Soil series and map symbols	Cottages and utility buildings	Tent and camping trailer sites
Avonburg: AvA, AvB2	Moderate: seasonal high water table at a depth of 1 to 3 feet; very slow permeability.	Severe: somewhat poorly drained; very slow permeability.
Bartle: Ba	Moderate: seasonal high water table at a depth of 1 to 3 feet; very slow permeability.	Severe: somewhat poorly drained; very slow permeability.
Bonnie: Bo	Severe: subject to flooding; poorly drained to very poorly drained.	Severe: poorly drained to very poorly drained; subject to flooding.
Brookston: Br	Severe: very poorly drained; subject to ponding.	Severe: very poorly drained; subject to ponding.
Cincinnati:		
CnB2	Slight	Moderate: very slow permeability.
CnC2	Moderate: moderately sloping; slope hinders use; very slow permeability.	Moderate: moderately sloping; slope hinders development of site.
CnC3	Moderate: moderately sloping; slope hinders development of site.	Moderate: moderately sloping; slope hinders use; very slow permeability.
CnD2, CnD3	Severe: strongly sloping; slope severely hinders development of site.	Severe: strongly sloping; slope severely hinders use.
CoC2	Moderate: moderately sloping; slope hinders development of site.	Moderate: moderately sloping; slope hinders use; very slow permeability.
Clermont: Cr	Severe: poorly drained; seasonal high water table at a depth of 0 to 1 foot.	Severe: poorly drained; very slow permeability.
Corydon: CyF	Severe: steep to very steep	Severe: steep to very steep
Eel: Ee	Severe:[1] subject to flooding	Severe:[1] subject to flooding
Elkinsville:		
ElA	Slight	Slight
ElB2	Slight	Slight
ElC2	Moderate: moderately sloping; slope hinders development of site.	Moderate: moderately sloping; slope hinders use.
Fincastle:		
FcA	Moderate: seasonal high water table at a depth of 1 to 3 feet.	Moderate: somewhat poorly drained; slow permeability.
FrB2	Moderate: seasonal high water table at a depth of 1 to 3 feet.	Moderate: somewhat poorly drained; slow permeability.
Genesee: Ge	Severe:[1] subject to flooding	Severe:[1] subject to flooding
Grayford:		
GfB2	Slight	Slight
GfC2	Moderate: moderately sloping; slope hinders development of site.	Moderate: moderately sloping; slope hinders use.
GfC3	Moderate: moderately sloping; slope hinders development of site.	Moderate: moderately sloping; slope hinders use.
GfD2, GfD3	Severe: strongly sloping; slope severely hinders development of site.	Severe: strongly sloping; slope severely hinders use.
GoE2	Severe: moderately steep; slope severely hinders development of site.	Severe: moderately steep; slope severely hinders use.

for specified recreation uses

Picnic grounds, parks, and extensive play areas	Playgrounds, athletic fields, and intensive play areas	Paths and trails	Golf fairways
Moderate: somewhat poorly drained.	Severe: somewhat poorly drained; very slow permeability.	Moderate: somewhat poorly drained.	Moderate: somewhat poorly drained.
Moderate: somewhat poorly drained.	Severe: somewhat poorly drained; very slow permeability.	Moderate: somewhat poorly drained.	Moderate: somewhat poorly drained.
Severe: poorly drained to very poorly drained; subject to flooding.	Severe: poorly drained to very poorly drained; subject to flooding.	Severe: poorly drained to very poorly drained; subject to flooding.	Severe: poorly drained to very poorly drained; subject to flooding.
Severe: very poorly drained; subject to ponding.	Severe: very poorly drained; subject to ponding.	Severe: very poorly drained; subject to ponding.	Severe: very poorly drained; subject to ponding.
Slight	Moderate: gently sloping; slope hinders use; very slow permeability.	Slight	Slight.
Moderate: moderately sloping; slope hinders use.	Severe: moderately sloping; slope severely hinders use.	Slight	Moderate: moderately sloping; slope hinders use.
Moderate: moderately sloping; slope hinders use.	Severe: moderately sloping; slope severely hinders use.	Slight	Severe: severely eroded.
Severe: strongly sloping; slope severely hinders use.	Severe: strongly sloping; slope severely hinders use.	Moderate: strongly sloping; slope hinders use.	Severe: strongly sloping; slope severely hinders use.
Moderate: moderately sloping; slope hinders use.	Severe: moderately sloping; slope severely hinders use.	Slight	Moderate: moderately sloping; slope hinders use.
Severe: poorly drained; seasonal high water table at a depth of 0 to 1 foot.	Severe: poorly drained; seasonal high water table at a depth of 0 to 1 foot; very slow permeability.	Severe: poorly drained; seasonal high water table at a depth of 0 to 1 foot.	Severe: poorly drained; seasonal high water table at a depth of 0 to 1 foot.
Severe: steep to very steep	Severe: steep to very steep	Severe: steep to very steep; bedrock exposed on surface in places.	Severe: steep to very steep.
Moderate:[1] subject to flooding.	Severe:[1] subject to flooding	Moderate:[1] subject to flooding.	Moderate:[1] subject to flooding.
Slight	Slight	Slight	Slight.
Slight	Moderate: gently sloping; slope hinders use.	Slight	Slight.
Moderate: moderately sloping; slope hinders use.	Severe: moderately sloping; slope severely hinders use.	Slight	Moderate: moderately sloping; slope hinders use.
Moderate: somewhat poorly drained.	Moderate: somewhat poorly drained; slow permeability.	Moderate: somewhat poorly drained.	Moderate: somewhat poorly drained.
Moderate: somewhat poorly drained.	Moderate: somewhat poorly drained; slow permeability.	Moderate: somewhat poorly drained.	Moderate: somewhat poorly drained.
Moderate:[1] subject to flooding.	Severe:[1] subject to flooding	Moderate:[1] subject to flooding.	Moderate:[1] subject to flooding.
Slight	Moderate: gently sloping; slope hinders use.	Slight	Slight.
Moderate: moderately sloping; slope hinders use.	Severe: moderately sloping; slope severely hinders use.	Slight	Moderate: moderately sloping; slope hinders use.
Moderate: moderately sloping; slope hinders use.	Severe: moderately sloping; slope severely hinders use.	Slight	Severe: severely eroded.
Severe: strongly sloping; slope severely hinders use.	Severe: strongly sloping; slope severely hinders use.	Moderate: strongly sloping; slope hinders use.	Severe: strongly sloping; slope severely hinders use.
Severe: moderately steep; slope severely hinders use.	Severe: moderately steep; slope severely hinders use.	Moderate: moderately steep; slope hinders use.	Severe: moderately steep; slope severely hinders use.

TABLE 6.—*Limitations of the soils*

Soil series and map symbols	Cottages and utility buildings	Tent and camping trailer sites
Gullied land: Gu. Too variable for reliable estimates to be made.		
Haymond: Ha	Severe:[1] subject to flooding	Severe:[1] subject to flooding
Hickory: HkE2	Severe: moderately steep; slope severely hinders development of site.	Severe: moderately steep; slope severely hinders use.
HkF	Severe: steep to very steep; slope severely hinders development of site.	Severe: steep to very steep; slope severely hinders use.
Jennings: JnB2	Slight	Moderate: very slow permeability.
JnC2	Moderate: moderately sloping; slope hinders development of site.	Moderate: moderately sloping; slope hinders use; very slow permeability.
JnC3	Moderate: moderately sloping; slope hinders development of site.	Moderate: moderately sloping; slope hinders use; very slow permeability.
JnD2, JnD3	Severe: strongly sloping; slope severely hinders development of site.	Severe: strongly sloping; slope severely hinders use.
Miami: MmC2	Moderate: moderately sloping; slope hinders development of site.	Moderate: moderately sloping; slope hinders use.
MmD2	Severe: strongly sloping; slope severely hinders development of site.	Severe: strongly sloping; slope severely hinders use.
MoC3	Moderate: moderately sloping; slope hinders development of site.	Moderate: moderately sloping; slope hinders use.
Parke: PaB2	Slight	Slight
PaC2	Moderate: slope hinders development of site.	Moderate: slope hinders use
PaC3	Moderate: slope hinders development of site.	Moderate: slope hinders use
Pekin: PcA, PcB2	Slight	Severe: very slow permeability
PcC2	Moderate: moderately sloping; slope hinders development of site.	Moderate: moderately sloping; slope hinders use; very slow permeability.
Peoga: Pe	Severe: poorly drained; seasonal high water table at a depth of 0 to 1 foot.	Severe: poorly drained; slow permeability.
Rossmoyne: RsA, RsB2	Slight	Severe: very slow permeability
RsB3	Slight	Severe: very slow permeability
Steff: St	Severe:[1] subject to flooding	Severe:[1] subject to flooding
Stendal: Sx	Severe:[1] subject to flooding	Severe:[1] subject to flooding
Trappist: TrC2	Moderate: moderately sloping; slope hinders development of site.	Moderate: moderately sloping; slope hinders use; slow permeability.

for specified recreation uses—Continued

Picnic grounds, parks, and extensive play areas	Playgrounds, athletic fields, and intensive play areas	Paths and trails	Golf fairways
Moderate:[1] subject to flooding.	Severe:[1] subject to flooding	Moderate:[1] subject to flooding.	Moderate:[1] subject to flooding.
Severe: moderately steep; slope severely hinders use.	Severe: moderately steep; slope severely hinders use.	Moderate: moderately steep; slope hinders use.	Severe: moderately steep; slope severely hinders use.
Severe: steep to very steep; slope severely hinders use.	Severe: steep to very steep; slope severely hinders use.	Severe: steep to very steep; slope severely hinders use.	Severe: steep to very steep; slope severely hinders use.
Slight	Moderate: gently sloping; slope hinders use; very slow permeability.	Slight	Slight.
Moderate: moderately sloping; slope hinders use.	Severe: moderately sloping; slope severely hinders use.	Slight	Moderate: moderately sloping; slope hinders use.
Moderate: moderately sloping; slope hinders use.	Severe: moderately sloping; slope severely hinders use.	Slight	Severe: severely eroded.
Severe: strongly sloping; slope severely hinders use.	Severe: strongly sloping; slope severely hinders use.	Moderate: strongly sloping; slope hinders use.	Severe: strongly sloping; slope severely hinders use.
Moderate: moderately sloping; slope hinders use.	Severe: moderately sloping; slope severely hinders use.	Slight	Moderate: moderately sloping; slope hinders use.
Severe: strongly sloping; slope severely hinders use.	Severe: strongly sloping; slope severely hinders use.	Moderate: strongly sloping; slope hinders use.	Severe: strongly sloping; slope severely hinders use.
Moderate: moderately sloping; slope hinders use.	Severe: moderately sloping; slope severely hinders use.	Slight	Severe: severely eroded.
Slight	Moderate: gently sloping; slope hinders use.	Slight	Slight.
Moderate: slope hinders use	Severe: slope severely hinders use.	Moderate: slope hinders use	Moderate: slope hinders use.
Moderate: slope hinders use	Severe: slope severely hinders use.	Moderate: slope hinders use	Severe: severely eroded.
Slight	Severe: very slow permeability.	Slight	Slight.
Moderate: moderately sloping; slope hinders use.	Severe: very slow permeability; moderately sloping; slope severely hinders use.	Slight	Moderate: moderately sloping; slope hinders use.
Severe: poorly drained; seasonal high water table at a depth of 0 to 1 foot; slow permeability.	Severe: poorly drained; seasonal high water table at a depth of 0 to 1 foot.	Severe: poorly drained; seasonal high water table at a depth of 0 to 1 foot.	Severe: poorly drained; seasonal high water table at a depth of 0 to 1 foot.
Slight	Severe: very slow permeability.	Slight	Slight.
Slight	Severe: very slow permeability.	Slight	Severe: severely eroded.
Moderate:[1] subject to flooding.	Severe:[1] subject to flooding	Moderate:[1] subject to flooding.	Moderate:[1] subject to flooding.
Moderate:[1] subject to flooding.	Severe:[1] subject to flooding	Moderate:[1] subject to flooding.	Moderate:[1] subject to flooding.
Moderate: moderately sloping; slope hinders use.	Severe: moderately sloping; slope severely hinders use.	Slight	Moderate: moderately sloping; slope hinders use.

TABLE 6.—*Limitations of the soils*

Soil series and map symbols	Cottages and utility buildings	Tent and camping trailer sites
TrD2, TsD3	Severe: strongly sloping; slope severely hinders development of site.	Severe: strongly sloping; slope severely hinders use.
TsC3	Moderate: moderately sloping; slope hinders development of site.	Moderate: moderately sloping; slope hinders use; slow permeability.
Wakeland: Wa	Severe:[1] subject to flooding	Severe:[1] subject to flooding
Weikert: WkE2	Severe: moderately steep and steep.	Severe: moderately steep and steep.
Wilbur: Wu	Severe:[1] subject to flooding	Severe:[1] subject to flooding

[1] Slight limitation when soil is not flooded.

Coniferous woody plants are cone-bearing trees and shrubs, mainly of importance as cover for wildlife, but they may also furnish food in the form of browse, seeds, or fruitlike cones. These plants are commonly established through natural processes, but they also may be planted. Examples of these plants are pines, spruces, white cedars, hemlocks, balsam firs, redcedars, junipers, and yews.

Wetland food and cover plants are annual and perennial wild herbaceous plants on moist to wet sites, exclusive of submerged or floating aquatics, that produce food or cover extensively used by wetland forms of wildlife. Examples of these plants are smartweeds, wild millets, bulrushes, sedges, reeds, cattails, and pondweeds.

Shallow water developments are impoundments or areas excavated to control water generally not more than 5 feet deep. Examples of shallow water developments are low dikes and levees, shallow dugouts, level ditches, devices for water level control, or marshy streams and channels.

Ponds are dug-out areas or combinations of dug-out areas and low dikes (dammed areas) where the water is of suitable quality, of suitable depth, and in ample supply for the production of fish or wildlife. An example is a pond that has at least 0.1 acre in a surface area and that has an average depth of 6 feet over at least 25 percent of the area. A dependably high water table or other source of unpolluted ground water of low acidity is needed. Surface runoff from watershed areas was not considered.

Openland wildlife includes birds and mammals that normally frequent cropland, pasture, meadows, lawns, and areas overgrown with grasses, herbs, and shrubby growth. Examples of these animals are quail, rabbits, and red foxes.

Woodland wildlife includes birds and mammals that normally frequent wooded areas of hardwood trees and shrubs, coniferous trees and shrubs, or a mixture of such plants. Examples of these animals are ruffed grouse, woodcocks, gray squirrel, fox squirrel, gray foxes, and deer.

Wetland wildlife includes birds and mammals that normally frequent ponds, streams, ditches, marshes, swamps, and other wet areas. Examples of these birds and mammals are ducks, geese, rails, minks, and muskrats.

Recreation

The landscape and resources of the survey area and its location relative to centers of population make it feasible to develop some recreational enterprises that can produce income. Among the most likely enterprises are hunting areas, shooting preserves, improved picnic areas, fishing, and water sports.

Many recreational facilities have been established and are in use. Among these are Muscatatuck National Wildlife Refuge, Crosley State Game Preserve, Brush Creek Fish and Game Refuge, Selmier State Forest, and Muscatatuck State Park.

Watershed development in the county offers potential for multipurpose impoundments of different sizes. Reservoirs provide opportunity for boating, fishing, swimming, and other water-based recreation. Some well-drained soils in upland areas are well suited to picnic grounds, intensive play areas, and tent and camp trailer sites.

In table 6 on page 52, the soils of the county are rated according to their limitations for developing six kinds of recreational facilities. There are cottages and utility buildings; tent and camping trailer sites; picnic grounds, parks, and extensive play areas; playgrounds, athletic fields, and intensive play areas; paths and trails; and golf fairways.

The degrees of limitation used in table 6 are slight, moderate, and severe. Except for a slight degree, the kind of limitation of the soil for developing a specific recreational facility is also given. *Slight* means that the facility is easily created, improved, or maintained, and that there are few or no limitations that affect the design of management. *Moderate* means that the facility generally can be created, improved, or maintained, but there are moderate soil limitations that affect design and management. *Severe* means that the practicability of establishing the facility is question-

for specified recreation uses

Picnic grounds, parks, and extensive play areas	Playgrounds, athletic fields, and intensive play areas	Path and trails	Golf fairways
Severe: strongly sloping; slope severely hinders use.	Severe: strongly sloping; slope severely hinders use.	Moderate: strongly sloping; slope hinders use.	Severe: strongly sloping; slope severely hinders use.
Moderate: moderately sloping; slope hinders use.	Severe: moderately sloping; slope severely hinders use.	Slight	Severe: severely eroded; slope hinders use.
Moderate:[1] subject to flooding.	Severe:[1] subject to flooding	Moderate:[1] subject to flooding.	Moderate:[1] subject to flooding.
Severe: moderately steep and steep.	Severe: moderately steep and steep.	Severe: moderately steep and steep; rocky slopes.	Severe: moderately steep and steep.
Moderate:[1] subject to flooding.	Severe:[1] subject to flooding	Moderate:[1] subject to flooding.	Moderate:[1] subject to flooding.

able, that extreme measures are needed to overcome the limitation, and that usage is generally unsound or not practical.

The column headings in table 6 are discussed in the following paragraphs.

Cottages and utility buildings are seasonal or year-round cottages, washrooms and bathrooms, picnic shelters, and service buildings. The soil features considered are wetness and flooding, slope, rockiness, stoniness, and depth to hard bedrock. Additional features that must be considered are suitability for septic tank filter fields, shrink-swell potential, frost potential, hillside slippage, and bearing capacity. Suitability of soils for supporting vegetation and whether basements and underground utilities are planned should also be considered.

Tent and camp trailer sites are areas suitable for camping sites and the accompanying activities of outdoor living. They are used frequently during the camping season. These areas require little site preparation. These areas should be suitable for unsurfaced parking of camper trucks and camp trailers as well as heavy foot traffic by humans and horses, and vehicular traffic. Factors considered are the hazards of wetness and flooding, permeability, slope, surface soil texture, coarse fragments, and stoniness or rockiness. Suitability of soils for supporting vegetation should also be considered.

Picnic areas, parks, and extensive play areas are areas subjected to heavy foot traffic. The features considered are the hazards of wetness and flooding, slope, texture of surface soil, and stoniness and rockiness. Not included are such features as presence of trees or ponds, but these may affect the desirability of a site. Suitability of soils for supporting vegetation should also be considered.

Playgrounds, athletic fields, and intensive play areas are areas developed for playgrounds and organized games, such as baseball, football, tennis, badminton, and basketball. They are subject to heavy foot traffic and generally require a level surface, good drainage, and a soil texture and consistence that gives a firm surface. It is assumed that good vegetative cover can be established and maintained in areas where needed.

Paths and trails are areas used for trails, cross-country hiking, bridle paths, and other intensive uses that allow for the movement of people and horses. It is assumed that these areas are to be used as they occur in nature and that little soil will be moved. The most desirable soils for bridle paths and trails are well drained, have loamy texture, and are nearly level to sloping. They have good stability, are not subject to erosion, and are free of coarse fragments, stones, or rock outcrops. Where relief is sloping, consideration should be given to placement of paths and trails on contour to help control erosion. Variability in slope gradient on paths and trails may serve to enhance interest, but the slope should not exceed 12 percent over long distances.

Golf course fairways refer to areas of soil used for golf courses. Greens, traps, and hazards are manmade, generally from disturbed, transported soil material. The soils used for fairways should be well drained and firm, free of flooding during periods of use, have good trafficability, contain a minimum of coarse fragments or stones, and have gently undulating slopes. They should be capable of supporting a good turf and be well suited to many kinds of trees and shrubs. Loamy soils are better than other soils, but if irrigated, coarser textured soils serve equally well. Poorly drained mineral soils have severe limitations, but they can be used for pond sites to provide esthetic value or for storing water for turf maintenance. Sandy soils may also be designed to provide golf hazards or used as a source of sand for greens.

Engineering Uses of the Soils[3]

This section is useful to those who need information about soils used as structural material or as foundation upon which structures are built. Among those who can benefit from this section are planning commissions, town and city managers, land developers, engineers, contractors, and farmers.

Among properties of soils highly important in engi-

[3] HAROLD W. BELCHER, JR., area engineer, Soil Conservation Service, assisted in preparing this section.

TABLE 7.—*Engineering*

[Tests performed by Soils and Pavement Design Laboratory, Joint Highway Research Project, School of of the American Association of

Soil name and location	Parent material	Report No. S70-IN-40	Depth	Moisture-density data[1]		Mechanical analysis[2]			
				Maximum dry density	Optimum moisture	Percentage passing sieve—			
						1-inch	¾-inch	⅜-inch	No. 4 (4.7 mm)
			Inches	*Lb per cu ft*	*Percent*				
Jennings silt loam: 1,200 feet east and 1,200 feet north of southwest corner of SE1/4 sec. 24, T. 6 N., R. 8 E. (modal)	Loess on Illinoian Till (ground moraine).	3–1	0–6	104	18	100	100	100	100
		3–4	22–30	118	12	100	100	97	94
		3–8	66–70	106	18	100	100	100	99
Rossmoyne silt loam: NW1/4NW1/4 sec. 10, T. 6 N., R. 8 E. (modal)	Loess on Illinoian Till (ground moraine).	4–2	3–9	108	15	100	100	100	100
		4–6	27–43	112	16	100	100	100	99
		4–10	85–129	109	18	100	100	99	98
Trappist silt loam: NW1/4 sec. 13, T. 6 N., R. 8 E. (modal)	Loess on black shale (plain).	1–5	25–30	103	20	100	100	100	99
		1–7	36–40	99	24	100	100	99	93

[1] Based on AASHO Designation T 99–57, Method A (*1*).

[2] Mechanical analyses according to AASHO Designation T88-57 (*1*). Results by this procedure frequently may differ somewhat from results that would have been obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analyses used in this table are not suitable for use in naming textural classes for soil.

neering are permeability, strength, compaction characteristics, soil drainage, shrink-swell potential, grain size, plasticity, and soil reaction. Also important are depth to the water table, depth to bedrock, and soil slope. These properties, in various degrees and combinations, affect construction and maintenance of roads, airports, pipelines, foundations for small buildings, irrigation systems, ponds and small dams, and systems for disposal of sewage and refuse.

Information in this section of the soil survey can be helpful to those who—

1. Select potential residential, industrial, commercial, and recreational areas.
2. Evaluate alternate routes for roads, highways, pipelines, and underground cables.
3. Seek sources of gravel, sand, or clay.
4. Plan farm drainage systems, irrigation systems, ponds, terraces, and other structures for controlling water and conserving soil.
5. Correlate performance of structures already built with properties of the kinds of soil on which they are built, for the purpose of predicting performance of structures on the same or similar kinds of soil in other locations.
6. Predict the trafficability of soils for cross-country movement of vehicles and construction equipment.
7. Develop preliminary estimates pertinent to construction in a particular area.

Most of the information in this section is presented in tables. Table 7 shows the results of engineering laboratory tests on soil samples; table 8 gives several estimated soil properties significant to engineering; and table 9 gives interpretations for various engineering uses.

This information, along with the soil map and other parts of this publication, can be used to make interpretations in addition to those given in tables 8 and 9, and it also can be used to make other useful maps.

This information, however, does not eliminate the need for further investigations at sites selected for engineering works. Investigations should be conducted for works that involve heavy loads or that require excavations to depths greater than those shown in the tables, generally depths greater than 6 feet. Also, inspection of sites, especially the small ones, is needed because many mapped areas of a given soil mapping unit may contain small areas of other kinds of soil that have strongly contrasting properties and different suitabilities or limitations for soil engineering.

Some of the terms used in this soil survey have special meaning to soil scientists. The Glossary defines many of those terms commonly used in soil science.

Engineering soil classification systems

The two systems most commonly used in classifying samples of soils for engineering are the Unified system (*13*) used by the SCS engineers, Department of Defense, and others, and the AASHO system (*1*) adopted by the American Association of State Highway Officials.

In the Unified system soils are classified according to particle size distribution, plasticity, liquid limit, and organic matter. Soils are grouped in 15 classes. There are eight classes of coarse-grained soils, identified as

test data

Civil Engineering, Purdue University, West Lafayette, Indiana, in accordance with standard procedures
State Highway Officials (AASHO)]

Mechanical analysis[2]							Liquid limit	Plasticity index	Classification	
Percentage passing sieve—			Percentage smaller than—						AASHO[3]	Unified[4]
No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)	0.05 mm	0.02 mm	0.005 mm	0.002 mm				
95	93	88	87	75	40	33	39	16	A–6(10)	CL
89	82	62	61	53	25	20	24	8	A–4(5)	CL
94	92	86	82	77	53	46	46	18	A–7–6(12)	ML
98	95	85	83	73	34	27	30	7	A–4(8)	ML
90	87	74	72	62	35	30	26	9	A–4(8)	CL
95	91	67	64	54	41	37	32	13	A–4(8)	CL
98	94	89	87	82	50	40	37	11	A–6(9)	ML
78	72	69	69	68	52	46	43	13	A–7–5(9)	ML

[3] Based on AASHO Designation M 145-49 (*1*).

[4] Based on the Unified Soil Classification System (*13*).

GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes are designated by symbols for both classes; for example, CL–ML.

The AASHO system is used to classify soils according to those properties that affect use in highway construction and maintenance. In this system, a soil is placed in one of seven basic groups ranging from A–1 through A–7 on the basis of grain-size distribution, liquid limit, and plasticity index. In group A–1 are gravelly soils of high bearing strength, or the best soils for subgrade (foundation). At the other extreme, in group A–7, are clay soils that have low strength when wet and that are the poorest soils for subgrade. Where laboratory data are available to justify a further breakdown, the A–1, A–2, and A–7 groups are divided as follows: A–1–a, A–1–b, A–2–1, A–2–5, A–2–6, A–2–7, A–7–5, and A–7–6. As an additional refinement, the engineering value of a soil material can be indicated by a group index number. Group indexes range from 0 for the best material to 20 or more for the poorest. The AASHO classification for tested soils, with group index numbers in parentheses, is shown in table 7; the estimated classification, without group index numbers, is given in table 8 for all soils mapped in the survey area.

Soil test data

Table 7 contains test data on samples of three soil series in the county. These samples were tested by standard procedures in the laboratories of the Joint Highway Research Project at Purdue University. The samples do not represent all the soils in Jennings County, nor do they include the entire range of characteristics of any series sampled. Not all layers of each profile were sampled. The test results, however, have been used as a general guide in estimating the engineering properties of the soils of the county. Tests were made for moisture-density relationships, liquid limit, and plastic limit. Texture was determined by mechanical analysis.

Moisture-density relationships indicate the content of moisture at which soil material can be compacted to a maximum dry density for that compactive effort. If a soil is compacted at successively higher contents of moisture, assuming that the compactive effort remains the same, the density of the compacted material increases until the *optimum moisture content* is reached. After that, the density decreases with increases in content of moisture. The ovendry weight, in pounds per cubic foot, of soil material that was compacted at optimum moisture content is termed the *maximum dry density*. Data on the relationship of moisture to density is important in planning earthwork. Generally, a soil is most stable if compacted to about its maximum dry density when it is at approximately the optimum content of moisture for standard compactive effort.

Mechanical analysis to determine the particle-size distribution of the soil material was made by a combination of the sieve and hydrometer methods. The names of the various particle sizes—sand, silt, and clay—do not mean the same when used by engineers as when they are used by soil scientists. For example, to soil scientists "clay" means mineral grains less than

TABLE 8.—*Estimated soil properties*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up to two or more kinds
to follow carefully the instructions for referring to other series that

Soil series and map symbols	Depth to— Bedrock[1]	Depth to— Seasonal high water table	Frost potential	Depth from surface	Dominant USDA texture	Classification Unified
	Feet	*Feet*		*Inches*		
Avonburg: AvA, AvB2	6–10+	1–3	High	0–18	Silt loam	ML or CL–ML
				18–35	Heavy silt loam to light silty clay loam.	CL or ML
				35–71	Silty clay loam to light clay loam.	CL
				71–81	Clay loam	CL
Bartle: Ba	6–10+	1–3	High	0–15	Silt loam	ML or CL
				15–25	Silt loam	ML or CL
				25–60	Silt loam to light silty clay loam.	ML or CL
Bonnie: Bo	5–10+	[3]0–1	High	0–8	Silt loam	ML or CL
				8–40	Silt loam	ML or CL
				40–72	Silt loam and heavy silt loam.	ML or CL
Brookston: Br	15+	[3]0–1	High	0–16	Silty clay loam	CL or ML
				16–48	Light silty clay loam and silty clay loam to clay loam.	CH, MH, or CL
				48–72	Loam	CL
*Cincinnati: CnB2, CnC2, CnC3, CnD2, CnD3, CoC2. For Rossmoyne part of CoC2, see Rossmoyne series.	6–10+	6+	High	0–9	Silt loam	ML or CL–ML
				9–27	Heavy silt loam to light silty clay loam.	CL or ML
				27–52	Heavy loam to loam	CL or ML
				52–72	Heavy clay loam	CL
Clermont: Cr	7–10+	0–1	High	0–20	Silt loam	CL–ML or ML
				20–40	Silt loam to silty clay loam.	CL
				40–70	Clay loam to silt loam	CL
				70–80	Loam	CL–ML or CL
Corydon: CyF	1–1¾	6+	Moderate	0–8	Stony silt loam	CH or CL
				8–16	Clay	CH or MH
				16	Bedrock	
Eel: Ee	5–10	3–6	High	0–13	Silt loam	ML or CL
				13–44	Loam	CL–ML, ML, or CL
				44–60	Stratified loam and fine sandy loam.	CL–ML, ML, CL, or SM
Elkinsville: ElA, ElB2, ElC2	6–10+	6+	High	0–10	Silt loam	CL–ML, ML, or CL
				10–24	Silt loam to light silty clay loam.	CL or ML
				24–63	Loam	CL–ML, ML, or CL
				63–81	Sandy loam	SM
*Fincastle: FcA, FrB2 For Russell part of FrB2 see Russell series.	15+	1–3	High	0–12	Silt loam	CL
				12–28	Silt loam to silty clay loam.	CL
				28–48	Clay loam to heavy loam	CH
				48–60	Loam	CL–ML or CL
Genesee: Ge	5–10	6+	Moderate	0–12	Loam	CL–ML, ML, or CL
				12–36	Loam	ML or CL
				36–60	Heavy sandy loam	SC or CL
*Grayford: GfB2, GfC2, GfC3, GfD2, GfD3, GoE2. For Corydon part of GoE2 see Corydon series.	3½–8	6+	Moderate	0–7	Silt loam	CL
				7–72	Silt loam to heavy silty clay loam.	CL
				72–76	Silty clay	MH, CL, or CH
				76–79	Clay	CH or MH
Gullied land: Gu. Too variable for reliable estimates to be made.						

significant to engineering

of soil. The soils in such mapping units may have different properties and limitations, and for this reason it is necessary appear in the first column of this table. The sign < means less than]

Classification	Percentage passing sieve—								
AASHO	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)	Liquid limit	Plasticity index	Permeability	Available water capacity	Reaction	Shrink-swell potential
				Percent		*Inches per hour*	*Inches per inch of soil*	*pH*	
A–4	100	90–100	70–90	25–32	0–5	0.60–2.0	0.22–0.24	5.1–7.3	Low.
A–4	100	95–100	70–95	28–35	6–10	0.20–0.60	0.19–0.21	4.5–5.5	Low.
A–6	100	90–100	80–90	25–33	14–18	<0.06	[2]0.06–0.08	4.5–5.5	Moderate.
A–6	100	90–100	70–80	25–33	14–18	0.20–0.60	[2]0.06–0.08	5.1–6.5	Moderate.
A–4	100	90–100	70–90	30–35	5–10	0.60–2.0	0.22–0.24	5.6–7.3	Low.
A–4	100	90–100	70–90	28–35	5–10	0.60–2.0	0.20–0.22	4.5–5.0	Low.
A–4 or A–6	100	95–100	75–95	30–35	9–15	<0.06	[2]0.06–0.08	4.5–5.0	Low.
A–4 or A–6	100	90–100	70–90	29–35	6–11	0.60–2.0	0.22–0.24	4.5–5.5	Low.
A–4	100	90–100	70–90	26–30	4–10	0.60–2.0	0.20–0.22	4.5–5.5	Low.
A–4	100	95–100	75–95	26–30	4–10	0.06–0.20	0.02–0.22	4.5–5.5	Low.
A–7	100	95–100	85–95	42–50	17–23	0.20–0.60	0.21–0.23	6.6–7.3	Moderate to high.
A–7	100	90–100	80–90	45–58	20–35	0.06–0.20	0.17–0.20	6.6–7.3	Moderate to high.
A–4 or A–6	85–100	70–80	65–80	22–30	7–13	0.20–0.60	0.12–0.19	7.9–8.4	Moderate.
A–4	100	90–100	70–90	20–30	2–6	0.60–2.0	0.22–0.24	4.5–7.3	Low.
A–4 or A–6	100	95–100	70–95	26–32	5–12	0.20–0.60	0.19–0.21	4.5–7.3	Low.
A–6 or A–4	100	90–100	70–80	34–42	14–22	<0.06	[2]0.06–0.08	4.5–5.5	Low.
A–6 or A–7	100	95–100	75–85	37–45	16–25	0.20–0.60	[2]0.06–0.08	5.1–6.5	Low.
A–4	100	90–100	70–90	20–30	3–10	0.60–2.0	0.22–0.24	4.5–7.3	Low.
A–6 or A–4	100	95–100	75–95	25–33	10–18	0.20–0.60	0.19–0.21	4.5–5.0	Low.
A–6 or A–4	100	90–100	70–90	23–31	9–16	<0.06	[4]0.06–0.08	4.5–5.5	Moderate.
A–4	85–100	70–80	65–80	17–23	4–10	0.20–0.60	[4]0.06–0.08	4.5–6.5	Low to moderate.
A–7	100	90–100	70–90	40–60	27–35	0.60–2.0	0.22–0.24	6.6–8.4	Low.
A–7	100	95–100	90–95	50–70	25–45	0.20–0.60	0.09–0.11	6.6–8.4	High.
A–4 or A–6	100	90–100	70–90	26–36	6–12	0.60–2.0	0.22–0.24	5.6–7.3	Low.
A–4	100	85–95	65–80	21–31	3–10	0.60–2.0	0.17–0.19	5.6–7.3	Low to moderate.
A–4	95–100	80–100	40–80	21–30	3–10	0.60–2.0	0.16–0.18	6.6–7.3	Low.
A–4	100	90–100	70–90	24–30	5–10	0.60–2.0	0.22–0.24	5.1–7.3	Low.
A–6	100	95–100	75–95	31–37	10–16	0.60–2.0	0.19–0.21	6.1–6.5	Low.
A–4	100	85–95	65–80	24–30	5–10	0.60–2.0	0.17–0.19	4.5–5.0	Low to moderate.
A–2 or A–4	100	65–85	25–50	15–25	4–9	2.0 –6.3	0.11–0.13	4.5–5.0	Low.
A–4 or A–6	100	90–100	70–90	27–31	7–12	0.60–2.0	0.22–0.24	5.1–7.3	Low.
A–7	100	95–100	75–95	40–49	23–30	0.20–0.60	0.19–0.21	5.1–5.5	Low.
A–7	100	90–100	70–80	50–60	34–40	0.06–0.20	0.16–0.19	5.1–7.3	Moderate.
A–4 or A–6	100	70–80	65–80	16–22	5–14	0.20–0.60	0.17–0.19	7.4–7.8	Low to moderate.
A–4	100	85–95	65–80	25–30	5–9	0.60–2.0	0.20–0.22	5.6–7.3	Low to moderate.
A–4 or A–6	100	85–95	65–80	27–33	8–13	0.60–2.0	0.17–0.19	5.6–7.3	Low to moderate.
A–4 or A–6	95–100	65–95	40–80	28–32	7–11	2.0–6.0	0.11–0.13	5.6–7.3	Low.
A–4 or A–6	100	85–95	65–80	27–31	7–12	0.60–2.0	0.22–0.24	5.1–7.3	Low.
A–7	100	95–100	75–95	40–49	23–30	0.60–2.0	0.18–0.20	5.1–6.5	Moderate to high.
A–7	100	95–100	85–95	45–60	23–40	0.60–2.0	0.10–0.12	5.6–6.0	Moderate to high.
A–7	100	95–100	90–95	50–70	25–45	0.60–2.0	0.08–0.10	5.1–7.3	High.

TABLE 8.—*Estimated soil properties*

Soil series and map symbols	Depth to—		Frost potential	Depth from surface	Dominant USDA texture	Classification
	Bedrock[1]	Seasonal high water table				Unified
	Feet	*Feet*		*Inches*		
Haymond: Ha	5–10	6+	High	0–7	Silt loam	CL–ML, ML, or CL
				7–38	Silt loam and loam	ML or CL
				38–72	Silt loam	ML or CL
Hickory: HkE2, HkF	3½–10+	6+	Moderate	0–8	Loam	CL–ML or CL
				8–14	Heavy loam	CL or CL–ML
				14–67	Light clay loam and clay loam.	CL
				67–75	Loam	CL–ML or CL
Jennings: JnB2, JnC2, JnC3, JnD2, JnD3.	4–6	6+	Moderate	0–6	Silt loam	ML or CL
				6–23	Light silty clay loam	CL
				23–60	Light clay loam to loam	CL or ML
Miami: MmC2, MmD2, MoC3	15+	6+	Moderate	0–8	Silt loam	ML or CL
				8–14	Heavy silt loam	ML or CL
				14–32	Clay loam and heavy clay loam.	CL
				32–38	Loam	CL–ML, ML or CL
				38–60	Loam	CL–ML, ML or CL
Parke: PaB2, PaC2, PaC3	8–12	6+	Moderate	0–11	Silt loam	ML or CL
				11–26	Light silty clay loam and silty clay loam.	CL or CL–ML
				26–50	Clay loam and light clay loam.	CL or CL–ML
				50–70	Sandy clay loam	SC or CL
Pekin: PcA, PcB2, PcC2	6–10+	3–6	High	0–7	Silt loam	ML or CL
				7–24	Silt loam to heavy silt loam.	ML or CL
				24–47	Silt loam to light silty clay loam.	ML or CL
				47–72	Silty clay loam	CL
Peoga: Pe	7–10+	0–1	High	0–15	Silt loam	ML or CL
				15–25	Heavy silt loam	ML or CL
				25–52	Light silty clay loam to silty clay loam.	CL
				52–72	Silt loam	CL
Rossmoyne: RsA, RsB2, RsB3	6–10+	3–6	High	0–12	Silt loam	CL–ML, ML or CL
				12–30	Heavy silt loam	CL–ML, ML or CL
				30–60	Loam	CL
				60–80	Loam to light clay loam	ML or CL
Russell. Mapped only in a complex with the Fincastle series.	15+	6+	Moderate	0–9	Silt loam	CL–ML, ML or CL
				9–24	Heavy silt loam and silty clay loam.	CL
				24–53	Clay loam	CL
				53–60	Light clay loam	CL
Steff: St	5–10	3–6	High	0–9	Silt loam	ML or CL
				9–40	Silt loam	ML or CL
				40–65	Silt loam	ML or CL
Stendal: Sx	5–10	1–3	High	0–7	Silt loam	ML or CL
				7–40	Silt loam	ML or CL
				40–72	Heavy silt loam	ML or CL
Trappist: TrC2, TrD2, TsC3, TsD3	2½–3½	6+	Moderate	0–6	Silt loam	ML or CL
				6–21	Heavy silt loam to heavy silty clay loam.	CL or ML
				21–40	Light silty clay to silty clay loam.	CL or ML
				40	Bedrock.	

significant to engineering—Continued

Classification AASHO	Percentage passing sieve— No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)	Liquid limit	Plasticity index	Permeability	Available water capacity	Reaction	Shrink-swell potential
				Percent		*Inches per hour*	*Inches per inch of soil*	*pH*	
A–4	100	85–95	65–80	25–35	4–10	0.60–2.0	0.22–0.24	5.6–7.3	Low.
A–4 or A–6	100	90–100	70–85	30–38	7–14	0.60–2.0	0.18–0.20	5.6–6.5	Low.
A–4 or A–6	100	90–100	70–90	30–38	7–14	0.60–2.0	0.20–0.22	5.6–6.0	Low.
A–4	100	85–95	65–80	17–23	4–10	0.60–2.0	0.20–0.22	4.5–6.5	Low to moderate.
A–6 or A–4	100	90–100	70–80	20–28	6–12	0.60–2.0	0.17–0.19	4.5–5.0	Moderate.
A–6	90–100	85–100	50–85	25–33	10–14	0.60–2.0	0.15–0.19	4.5–7.3	Moderate.
A4	100	70–80	65–80	17–23	4–10	0.60–2.0	0.17–0.19	7.9–8.4	Low to moderate.
A–4 or A–6	95–100	85–95	65–88	36–40	14–18	0.60–2.00	0.22–0.24	5.6–6.0	Low.
A–6 or A–7	100	95–100	70–80	36–41	14–18	0.20–0.60	0.18–0.20	4.0–6.0	Moderate.
A–6 or A–4	85–100	80–100	60–80	22–26	6–10	<0.06	[2]0.06–0.08	4.0–5.0	Moderate.
A–4 or A–6	100	85–95	65–80	30–35	4–12	0.60–2.0	0.22–0.24	5.1–7.3	Low.
A–6	100	95–100	75–95	30–40	12–17	0.60–2.0	0.20–0.22	5.1–5.5	Low.
A–6 or A–7	100	90–100	70–80	39–47	18–30	0.60–2.0	0.15–0.19	5.1–5.5	Moderate.
A–4	100	85–95	65–80	14–22	0–10	0.60–2.0	0.17–0.19	6.1–6.5	Low to moderate.
A–4	90–100	70–80	65–80	14–22	0–10	0.60–2.0	0.17–0.19	7.9–8.4	Low to moderate.
A–6 or A–4	100	85–95	65–80	33–39	10–16	0.60–2.0	0.22–0.24	5.1–7.3	Low.
A–6 or A–4	100	95–100	85–95	23–29	6–12	0.60–2.0	0.18–0.20	5.1–6.0	Moderate.
A–6 or A–4	100	90–100	70–80	23–29	6–12	0.60–2.0	0.15–0.19	4.5–5.5	Moderate.
A–2, A–4, or A–6	80–95	55–80	25–60	20–26	8–14	2.0–6.3	0.15–0.17	4.5–5.0	Low to moderate.
A–4 or A–6	100	85–95	65–80	28–38	7–15	0.60–2.0	0.22–0.24	5.1–7.3	Low.
A–4 or A–6	100	90–100	70–90	28–38	7–15	0.60–2.0	0.20–0.22	5.1–5.5	Low.
A–4 or A–6	100	95–100	75–95	28–38	7–15	<0.06	[2]0.06–0.08	4.5–5.5	Low.
A–7	100	95–100	85–95	40–50	20–30	0.20–0.63	[2]0.06–0.08	5.1–5.5	Moderate.
A–4 or A–6	100	90–100	70–90	28–36	8–14	0.60–2.0	0.22–0.24	4.5–7.3	Low.
A–4 or A–6	100	90–100	70–90	28–38	9–15	0.60–2.0	0.20–0.22	4.5–5.0	Low.
A–6	100	95–100	85–95	30–36	12–20	0.06–0.20	[4]0.06–0.08	4.5–6.0	Moderate.
A–6	100	90–100	70–90	33–39	14–23	0.60–2.0	[4]0.06–0.08	6.1–6.5	Low.
A–4 or A–6	95–100	90–100	70–90	20–30	2–12	0.60–2.0	0.22–0.24	5.1–7.3	Low.
A–4 or A–6	95–100	90–100	70–90	20–28	2–14	0.60–2.0	0.20–0.22	4.5–6.0	Low.
A–6 or A–4	90–100	85–95	65–85	26–35	9–16	<0.06	[2]0.06–0.08	4.5–5.5	Low to moderate.
A–6 or A–4	90–100	90–100	65–80	32–42	12–20	0.20–0.63	[2]0.06–0.08	5.1–7.3	Low to moderate.
A–4	100	90–100	70–90	25–31	2–8	0.60–2.0	0.22–0.24	5.1–7.3	Low.
A–6	100	95–100	70–95	33–45	16–25	0.60–2.0	0.19–0.21	4.5–6.0	Moderate.
A–6 or A–7	100	90–100	70–80	31–45	18–25	0.60–2.0	0.15–0.19	5.1–7.3	Moderate.
A–6 or A–7	100	90–100	70–80	35–43	15–21	0.60–2.0	0.14–0.18	7.9–8.4	Moderate.
A–4	100	90–100	70–90	28–35	3–9	0.60–2.0	0.22–0.24	4.5–5.5	Low.
A–4	100	90–100	70–90	28–35	3–9	0.60–2.0	0.20–0.22	4.5–5.5	Low.
A–4	100	90–100	70–90	28–35	3–9	0.60–2.0	0.20–0.22	5.1–5.5	Low.
A–4	100	90–100	70–90	28–35	3–9	0.60–2.0	0.22–0.24	4.5–5.5	Low.
A–4 or A–6	100	90–100	70–90	28–35	3–15	0.60–2.0	0.20–0.22	4.5–5.5	Low.
A–6 or A–4	100	95–100	75–95	28–35	3–15	0.60–2.0	0.20–0.22	4.5–5.0	Low.
A–4 or A–6	100	90–100	70–90	35–39	9–13	0.60–2.0	0.22–0.24	5.1–7.3	Low.
A–4 or A–6	100	95–100	85–95	35–39	9–13	0.20–0.60	0.19–0.21	4.5–5.5	Moderate to high.
A–6 or A–7	75–100	70–95	65–90	35–45	11–15	0.06–0.20	0.12–0.14	4.5–5.5	Moderate to high.

TABLE 8.—*Estimated soil properties*

Soil series and map symbols	Depth to— Bedrock[1]	Depth to— Seasonal high water table	Frost potential	Depth from surface	Dominant USDA texture	Classification Unified
	Feet	*Feet*		*Inches*		
Wakeland: Wa	5–10	1–3	High	0–8	Silt loam	ML or CL
				8–34	Silt loam	ML or CL
				34–65	Silt loam	ML or CL
Weikert: WkE2	1–1¾	6+	Moderate	0–4	Shaly silt loam	SM
				4–13	Shaly silt loam	SM
				13–17	Shaly silt loam	SM
				17	Bedrock.	
Wilbur: Wu	5–10	3–6	High	0–9	Silt loam	ML or CL
				9–36	Silt loam	ML or CL
				36–52	Silt loam	ML or CL
				52–60	Loam	ML or CL

[1] Most of the soils in Jennings County are underlain by limestone or black shale. Corydon, Grayford, and Parke soils are underlain by limestone only, and Jennings, Trappist, and Weikert by black shale.

[2] Fragipan limits water available to plants by restricting water movement and root penetration.

[3] Ponded.

0.002 millimeter in diameter, but to engineers it may mean all particles less than 0.005 millimeter in diameter.

The tests for liquid limit and plastic limit indicate the effect of water on the consistence of soil material. The liquid limit is the moisture content at which material changes from a plastic to a liquid. The plastic limit is the moisture content at which soil material passes from a semisolid to a plastic. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content through which a soil material is plastic.

Soil properties significant to engineering

Several estimated soil properties significant to engineering are given in table 8. These estimates are made for typical soil profiles, by layers sufficiently different to have different significance for soil engineering. The estimates are based on field observations made in the course of mapping, on test data for these and similar soils, and on experience with the same kinds of soil in other counties. The information in this table, in general, applies to a depth of about 5 feet or less. Following are explanations of some of the columns in table 8.

Depth to bedrock is distance from the surface of the soil to limestone or shale.

Depth to seasonal high water table is distance from the surface of the soil to the highest level that ground water reaches in the soil in most years.

Soil texture is described in table 8 in the standard terms used by the Department of Agriculture. These terms take into account relative percentages of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that contains 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the soil contains gravel or other particles coarser than sand, an appropriate modifier is added such as "gravelly loamy sand." "Sand," "silt," "clay," and some of the other terms used in USDA textural classification are defined in the Glossary of this soil survey.

Liquid limit and plasticity index have been explained for table 7. The data for liquid limit and plasticity index are based on tests of soil samples in table 7, but are estimated in table 8.

Permeability is that quality of a soil that enables it to transmit water or air. It is estimated on the basis of those soil characteristics observed in the field, particularly structure and texture. The estimates in table 8 do not take into account lateral seepage or such transient soil features as plowpans and surface crusts.

Available water capacity is the ability of soils to hold water for use by most plants. It is commonly defined as the difference between the amount of water in the soil at field capacity and the amount at the wilting point of most crop plants.

Reaction is the degree of acidity or alkalinity of a soil, expressed in pH values. The pH value and terms used to describe soil reaction are explained in the Glossary.

Frost potential includes heave caused by ice lenses forming in a soil and the subsequent loss of strength as a result of excess moisture during thawing periods. Three conditions must exist for frost action to become a major consideration: (1) a susceptible soil, (2) a source of water during the freezing period, and (3) a suitable temperature gradient that exists long enough for freezing temperatures to penetrate the ground.

Shrink-swell potential is the relative change in volume to be expected of soil material with changes in content of moisture, that is, the extent to which the soil shrinks as it dries out or swells when it is wet. Extent

significant to engineering—Continued

Classification	Percentage passing sieve—								
AASHO	No. 10 (2.0 mm)	No. 14 (0.42 mm)	No. 200 (0.074 mm)	Liquid limit	Plasticity index	Permability	Available water capacity	Reaction	Shrink-swell potential
				Percent		*Inches per hour*	*Inches per inch of soil*	*pH*	
A-4	100	90-100	70-90	28-35	3-9	0.60-2.0	0.22-0.24	5.6-7.3	Low.
A-4	100	90-100	70-90	28-35	3-9	0.60-2.0	0.20-0.22	5.6-7.3	Low.
A-4	100	90-100	70-90	28-35	3-9	0.60-2.0	0.20-0.22	6.6-7.3	Low.
A-4 or A-2	70-90	60-90	30-50	20-30	2-10	2.0-6.0	0.22-0.24	4.5-5.5	Low.
A-4 or A-2	70-90	60-90	30-50	[5]NP	[5]NP	2.0-6.0	0.20-0.22	4.5-5.5	Low.
A-4 or A-2	70-90	60-90	30-50	NP	NP	2.0-6.0	0.20-0.22	4.5-5.0	Low.
A-4	100	90-100	70-90	28-35	3-9	0.60-2.0	0.22-0.24	5.6-7.3	Low.
A-4 or A-6	100	90-100	70-90	28-35	3-15	0.60-2.0	0.20-0.22	5.6-6.5	Low.
A-4 or A-6	100	90-100	70-90	28-35	3-15	0.60-2.0	0.20-0.22	6.1-6.5	Low.
A-4 or A-6	100	70-80	65-80	28-35	3-15	0.60-2.0	0.17-0.19	6.1-6.5	Low to moderate.

[4] Layer is firm or very firm and brittle. It has characteristics of a fragipan, and it limits water available to plants by restricting water movement and root penetration.
[5] NP = Nonplastic.

of shrinking and swelling is influenced by the amount and kind of clay in the soil. Shrinking and swelling of soils causes much damage to building foundations, roads, and other structures. A *high* shrink-swell potential indicates a hazard to maintenance of structures built in, on, or with material having this rating.

Engineering interpretations of the soils

The estimated interpretations in table 9 are based on the engineering properties of soils in table 8, on test data for soils in this survey area and others nearby or adjoining, and on the experience of engineers and soil scientists with the soils of Jennings County. In table 9, ratings are used to summarize limitation or suitability of the soils for all listed purposes other than for drainage of cropland and pasture, irrigation, ponds and reservoirs, embankments, and terraces and diversions. For these particular uses, table 9 lists those soil features not to be overlooked in planning, installation, and maintenance.

Topsoil is used for topdressing an area where vegetation is to be established and maintained. Suitability is affected mainly by ease of working and spreading the soil material, as in preparation of a seedbed; natural fertility of the material, or response of plants when fertilizer is applied; and absence of substances toxic to plants. Texture of the soil material and its content of stone fragments are characteristics that affect suitability, but also considered in the ratings is damage that will result at the area from which topsoil is taken.

Sand and gravel are used in great quantities in many kinds of construction. The ratings in table 9 provide guidance about where to look for probable sources. A soil rated as a *good* or *fair* source of sand or gravel generally has a layer at least 3 feet thick, the top of which is within a depth of about 5 to 7 feet. The ratings do not take into account thickness of overburden, location of the water table, or other factors that affect mining of the materials; and neither do they indicate quality of the deposit.

Road fill is soil material used in embankments for roads. The suitability ratings reflect the predicted performance of soil after it has been placed in an embankment that has been properly compacted and provided with adequate drainage, and the relative case of excavating the material at borrow areas. Both the subsoil and underlying material are rated when they have different properties.

For highway location, the entire soil profile is evaluated. The ratings are for undisturbed soil without artificial drainage. Soil features considered are those that affect overall performance of the soil.

Dams, dikes, levees, and embankments require soil material resistant to seepage and piping and of favorable stability, shrink-swell potential, shear strength, and compactibility. Presence of stones or organic material in a soil are among factors that are unfavorable.

Pond and reservoir areas hold water behind a dam or embankment. Soils suitable for pond and reservoir areas have low seepage, which is related to their permeability and depth to fractured or permeable bedrock or other permeable material.

Drainage of cropland and pasture is affected by such soil properties as permeability, texture, and structure; depth of claypan, rock, or other layers that influence rate of water movement; depth to the water table; slope; stability in ditch banks; susceptibility to stream overflow; salinity or alkalinity; and availability of outlets for drainage.

Terraces and diversions are embankments, or ridges, constructed across the slope to intercept runoff so that it soaks into the soil or flows slowly to a prepared out-

TABLE 9.—*Interpretations of the*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds to follow carefully the instructions for referring to other

Soil series and map symbols	Suitability as a source of — Topsoil	Sand and gravel	Road fill	Soil features affecting highway location
Avonburg: AvA, AvB2	Fair in surface layer: low in organic-matter content.	Unsuited	Fair to poor in subsoil and underlying material: fair to poor shear strength; medium to high compressibility; fair stability; poor to fair compaction characteristics; moderate shrink-swell potential; high frost heave; seasonal high water table.	Medium to high compressibility in subsoil; moderate shrink-swell potential; high frost heave; seasonal high water table.
Bartle: Ba	Fair in surface layer: moderate in organic-matter content. Poor in subsoil: fragipan; seasonal high water table.	Unsuited	Fair to poor in subsoil and underlying material: fair to poor shear strength; medium to high compressibility; fair stability; poor to fair compaction characteristics; low shrink-swell potential; high frost heave; seasonal high water table.	Medium to high compressibility in subsoil; low shrink-swell potential; high frost heave; seasonal high water table.
Bonnie: Bo	Fair in upper 12 inches, poor below: low in organic-matter content; seasonal high water table.	Unsuited	Fair to poor in underlying material: fair to poor shear strength; medium to high compressibility; poor to fair stability; poor to fair compaction characteristics; low shrink-swell potential; high frost heave; seasonal high water table.	Medium to high compressibility; low shrink-swell potential; high frost heave; subject to flooding; seasonal high water table.
Brookston: Br	Fair in surface layer: somewhat clayey. Poor in subsoil: clayey; seasonal high water table.	Unsuited	Fair to poor in subsoil and underlying material: fair shear strength; medium to high compressibility; fair to poor stability; fair to poor compaction characteristics; moderate to high shrink-swell potential; high frost heave; seasonal high water table.	Medium to high compressibility in subsoil; moderate to high shrink-swell potential; high frost heave; seasonal high water table.
*Cincinnati: CnB2, CnC2, CnC3, CnD2, CnD3, CoC2. For Rossmoyne part of CoC2, see Rossmoyne series.	Fair in surface layer: low in organic-matter content.	Unsuited	Fair to poor in subsoil and underlying material: fair shear strength; medium to high compressibility; fair to good stability; fair to good compaction characteristics; low shrink-swell potential; high frost heave.	Medium to high compressibility in subsoil; low shrink-swell potential; high frost heave; cuts and fills needed; difficult to establish vegetation on cuts where fragipan is exposed.
Clermont: Cr	Fair in surface layer: low in organic-matter content. Poor in subsoil: low in organic-matter content; seasonal high water table.	Unsuited	Fair to poor in subsoil and underlying material: fair shear strength; medium to high compressibility; fair stability; fair compaction characteristics; moderate shrink-swell potential; high frost heave; seasonal high water table.	Medium to high compressibility in subsoil; moderate shrink-swell potential; high frost heave; seasonal high water table.
Corydon: CyF	Very poor: stone fragments throughout; shallow to bedrock.	Unsuited: possible source of limestone suitable for crushing.	Poor in subsoil and underlying material: steep to very steep; bedrock at a depth of less than 20 inches.	Steep to very steep; shallow to bedrock.

soils for engineering uses

of soil. The soils in such mapping units may have different properties and limitations, and for this reason it is necessary series that appear in the first column of this table]

Soil features affecting —				
Dams, dikes, levees, and embankments	Pond reservoir areas	Drainage of cropland and pasture	Terraces and diversions	Grassed waterways
Subsoil and underlying material: fair to poor shear strength; fair stability; poor to fair compaction; moderate shrink-swell potential; medium to low permeability when compacted; fair resistance to piping.	Slow seepage rate; seasonal high water table.	Somewhat poorly drained; water table at a depth of 1 to 3 feet; very slow permeability in fragipan.	Soil features favorable.	May be difficult to vegetate where fragipan is exposed.
Subsoil and underlying material: fair to poor shear strength; fair stability; poor to fair compaction characteristics; low shrink-swell potential; medium to low permeability when compacted; fair resistance to piping.	Slow seepage rate; seasonal high water table; nearly level; suitable for dug-out ponds.	Somewhat poorly drained; water table at a depth of 1 to 3 feet; very slow permeability in fragipan.	Not needed except to divert runoff from adjoining higher areas.	Generally not needed, except where a concentrated flow of runoff water comes from adjoining higher areas.
Underlying material: fair to poor shear strength; poor to fair compaction characteristics; low shrink-swell potential; medium to low permeability when compacted; poor resistance to piping.	Slow to moderate seepage rate; seasonal high water table; subject to flooding; nearly level; suitable for dug-out ponds.	Poorly drained to very poorly drained; water table at a depth of 0 to 1 foot; slow permeability.	Not needed except to divert runoff from adjoining higher areas.	Generally not needed, except where a concentrated flow of runoff water comes from adjoining higher areas.
Subsoil and underlying material: fair shear strength; fair to poor stability; fair to poor compaction characteristics; moderate to high shrink-swell potential; low permeability when compacted; good resistance to piping.	Slow seepage rate; seasonal high water table; nearly level; suitable for dug-out ponds.	Very poorly drained; water table at a depth of 0 to 1 foot; slow permeability.	Not needed except to divert runoff from adjoining higher areas.	Generally not needed, except where a concentrated flow of runoff water comes from adjoining higher areas.
Subsoil and underlying material: fair shear strength; fair to good stability; fair to good compaction characteristics; low shrink-swell potential; low permeability when compacted; good resistance to piping.	Slow seepage rate	Well drained	Soil features favorable.	May be difficult to vegetate where fragipan is exposed.
Subsoil and underlying material: fair shear strength; fair stability; fair compaction characteristics; moderate shrink-swell potential; medium to slow permeability when compacted; fair resistance to piping.	Slow seepage rate; seasonal high water table; nearly level; suitable for dug-out ponds.	Poorly drained; water table at a depth of 0 to 1 foot; very slow permeability.	Not needed	Generally not needed, except where a concentrated flow of runoff water comes from adjoining higher areas.
Subsoil and underlying material: steep to very steep; bedrock at a depth of less than 20 inches.	Shallow to bedrock that may have solution channels that allow seepage.	Well drained	Steep to very steep	Steep to very steep.

TABLE 9.—*Interpretations of the soils*

Soil series and map symbols	Suitability as a source of — Topsoil	Sand and gravel	Road fill	Soil features affecting highway location
Eel: Ee	Good in surface layer and underlying material: subject to flooding.	Unsuited	Fair to poor in underlying material: fair to poor shear strength; medium to high compressibility; fair to good stability; fair to poor compaction characteristics; low to moderate shrink-swell potential; high frost heave; subject to flooding.	Medium to high compressibility in subsoil; low to moderate shrink-swell potential; high frost heave; subject to flooding.
Elkinsville: ElA, ElB2, ElC2	Good in surface layer: somewhat clayey.	Unsuited	Fair in subsoil: fair shear strength; medium compressibility; fair stability; fair to good compaction characteristics; low to moderate shrink-swell potential; high frost heave. Good in underlying material: fair shear strength; slight compressibility; fair stability; fair to good compaction characteristics; low shrink-swell potential; low frost heave.	Medium compressibility in subsoil; low to moderate shrink-swell potential; high frost heave. Medium compressibility in underlying material; low shrink-swell potential; low frost heave.
*Fincastle: FcA, FrB2. For Russell part of FrB2, see Russell series.	Good in surface layer: moderate in organic-matter content. Fair to poor in subsoil: clayey; low in organic-matter content; seasonal high water table.	Unsuited	Fair to poor in subsoil and underlying material: fair shear strength; medium to high compressibility; fair to good stability; fair to good compaction characteristics; moderate shrink-swell potential; high frost heave; seasonal high water table.	Medium to high compressibility in subsoil; moderate shrink-swell potential; high frost heave; seasonal high water table.
Genesee: Ge	Good in surface layer and underlying material: subject to flooding.	Unsuited: possible source of sand and gravel in underlying material.	Fair to poor in underlying material: fair to poor shear strength; medium to high compressibility; fair to good stability; fair to poor compaction characteristics; low to moderate shrink-swell potential; moderate frost heave; subject to flooding.	Medium to high compressibility in subsoil; low shrink-swell potential; moderate frost heave; subject to flooding.
*Grayford: GfB2, GfC2, GfC3, GfD2, GfD3, GoE2. For Corydon part of GoE2, see Corydon series. Gullied land: Gu. Too variable for reliable estimates to be made.	Good in surface layer: moderate in organic-matter content. Poor in subsoil: clayey; low in organic-matter content.	Unsuited	Poor in subsoil and underlying material: fair to poor shear strength; high compressibility; fair to good stability; fair to good compaction characteristics; high shrink-swell potential; high frost heave; fractured bedrock at a depth of 3½ to 8 feet; clayey; highly plastic material above bedrock.	High compressibility in subsoil; high shrink-swell potential; high frost heave; fractured bedrock at a depth of 3½ to 8 feet; clayey, highly plastic material above bedrock; sinkholes in some areas.
Haymond: Ha	Good in surface layer and underlying material: subject to flooding.	Unsuited	Fair to poor in underlying material: poor shear strength; medium compressibility; poor to fair stability; poor compaction characteristics; low shrink-swell potential; high frost heave; subject to flooding.	Medium compressibility in subsoil; low shrink-swell potential; high frost heave; subject to flooding.
Hickory: HkE2, HkF	Good in surface layer: moderate in organic-matter content. Poor in subsoil: somewhat clayey; low in organic-matter content.	Unsuited	Fair to poor in subsoil and underlying material: fair shear strength; medium to high compressibility; fair stability; fair to good compaction characteristics; moderate shrink-swell potential; moderate frost heave.	Moderate to high compressibility in subsoil; moderate shrink-swell potential; moderate frost heave; cuts and fills needed; difficult to vegetate side slopes of deep cuts.

for engineering uses—Continued

Soil features affecting — Dams, dikes, levees, and embankments	Pond reservoir areas	Drainage of cropland and pasture	Terraces and diversions	Grassed waterways
Underlying material: fair to poor shear strength; fair to good stability; fair to poor compaction characteristics; low to moderate shrink-swell potential; medium to low permeability when compacted; fair resistance to piping.	Moderate to slow seepage rate; subject to flooding.	Moderately well drained.	Not needed, except to divert runoff from adjoining higher areas.	Not needed, except where overflow water concentrates.
Subsoil: fair strength; fair stability; fair to good compaction characteristics; low to moderate shrink-swell potential; low permeability when compacted; good resistance to piping. Underlying material: fair shear strength; fair stability; fair to good compaction characteristics; low shrink-swell potential; medium permeability when compacted; poor resistance to piping.	Rapid seepage rate in underlying material.	Well drained	Not needed	Not needed.
Subsoil and underlying material: fair shear strength; fair to good stability; fair to good compaction characteristics; moderate shrink-swell potential; low permeability when compacted; good resistance to piping.	Slow seepage rate; seasonal high water table.	Somewhat poorly drained; water table at a depth of 1 to 3 feet; slow permeability.	Soil features favorable.	Soil features favorable.
Underlying material: fair to poor shear strength; fair to good stability; fair to poor compaction characteristics; low to moderate shrink-swell potential; medium to low permeability when compacted; fair resistance to piping.	Slow to rapid seepage rate; variable textures in the underlying material; subject to flooding.	Well drained	Well drained	Not needed, except where overflow water concentrates.
Subsoil and underlying material: fair to poor shear strength; fair to good stability; fair to good compaction characteristics; high shrink-swell potential; low permeability when compacted; good resistance to piping; limestone bedrock at a depth of 3½ to 8 feet.	Depth to bedrock must be checked; rapid seepage in bedrock at a depth of 3½ to 8 feet.	Well drained	Soil features favorable.	Soil features favorable.
Underlying material: poor shear strength; poor to fair stability; poor compaction characteristics; low shrink-swell potential; medium permeability when compacted; poor resistance to piping.	Slow to rapid seepage rate; variable textures in the underlying material; subject to flooding.	Well drained	Not needed, except to divert runoff from adjoining higher areas.	Generally not needed, except where a concentrated flow of runoff water comes from adjoining higher areas.
Subsoil and underlying material: fair shear strength; fair stability; fair to good compaction characteristics; moderate shrink-swell potential; low permeability when compacted; good resistance to piping.	Slow seepage rate	Well drained	Soil features favorable.	Soil features favorable.

TABLE 9.—*Interpretations of the soils*

Soil series and map symbols	Suitability as a source of — Topsoil	Sand and gravel	Road fill	Soil features affecting highway location
Jennings: JnB2, JnC2, JnC3, JnD2, JnD3.	Good in surface layer: moderate in organic-matter content. Poor in subsoil: fragipan; lower part may contain shaly fragments; bedrock at a depth of 48 to 72 inches.	Unsuited	Fair to poor in subsoil and underlying material: poor to fair shear strength; medium to high compressibility; fair to good stability; fair to good compaction characteristics; moderate shrink-swell potential; high frost heave; shale bedrock at a depth of 48 to 72 inches.	Medium to high compressibility in subsoil; moderate shrink-swell potential; high frost heave; shale bedrock at a depth of 48 to 72 inches; cuts and fills needed; difficult to vegetate where fragipan or bedrock is exposed in cuts.
Miami: MmC2, MmD2, MoC3.	Fair to good in surface layer: eroded areas somewhat clayey. Fair to poor in subsoil: clayey.	Unsuited	Fair to poor in subsoil and underlying material: fair shear strength; medium to high compressibility; fair to good stability; fair to good compaction characteristics; moderate shrink-swell potential; high frost heave.	Medium to high compressibility in subsoil; moderate shrink-swell potential; high frost heave; cuts and fills needed.
Parke: PaB2, PaC2, PaC3.	Good in surface layer: moderate in organic-matter content. Fair in subsoil: somewhat clayey.	Unsuited: in places there are deposits of sand and gravel below 8 to 10 feet.	Fair in subsoil: fair to poor shear strength; medium compressibility; fair stability; fair to poor compaction charactistics; moderate shrink-swell potential; high frost heave. Fair in underlying material: good to fair shear strength; fair to good compaction; fair stability.	Medium compressibility in subsoil; moderate shrink-swell potential; high frost heave; cuts and fills generally needed; side slopes in cuts highly susceptible to erosion.
Pekin: PcA, PcB2, PcC2.	Fair in surface layer: low in organic-matter content. Poor in subsoil: fragipan; low in organic-matter content.	Unsuited	Fair to poor in subsoil and underlying material: fair to poor shear strength; medium compressibility; fair to good stability; fair to good compaction characteristics; moderate shrink-swell potential; high frost heave.	Medium compressibility in subsoil; moderate shrink-swell potential; high frost heave; cuts and fills needed; difficult to establish vegetation on cuts where fragipan is exposed.
Peoga: Pe	Fair in surface layer: low in organic-matter content. Poor in subsoil: low in organic-matter content; seasonal high water table.	Unsuited	Fair to poor in subsoil and underlying material: fair shear strength; medium to high compressibility; fair stability; fair compaction characteristics; moderate shrink-swell potential; high frost heave; seasonal high water table.	Medium to high compressibility in subsoil; moderate shrink-swell potential; high frost heave; seasonal high water table.
Rossmoyne: RsA, RsB2, RsB3.	Fair in surface layer: low in organic-matter content. Poor in subsoil: fragipan; low in organic-matter content.	Unsuited	Fair to poor in subsoil and underlying material: fair shear strength; medium to high compressibility; fair to good compaction characteristics; low to moderate shrink-swell potential; high frost heave.	Medium to high compressibility in subsoil; low to moderate shrink-swell potential; high frost heave; cuts and fills needed; cuts difficult to vegetate where fragipan is exposed.
Russell Mapped only in a complex with Fincastle series.	Good in surface layer. Fair to poor in subsoil: somewhat clayey.	Unsuited	Fair to poor in subsoil and underlying material: shear strength; medium to high compressibility; fair to good compaction characteristics; moderate shrink-swell potential; high frost heave.	Medium to high compressibility in subsoil; moderate shrink-swell potential; high frost heave; cuts and fills needed.

for engineering uses—Continued

Soil features affecting —				
Dams, dikes, levees, and embankments	Pond reservoir areas	Drainage of cropland and pasture	Terraces and diversions	Grassed waterways
Subsoil and underlying material: poor to fair shear strength; fair to good stability; fair to good compaction characteristics; moderate shrink-swell potential; low permeability when compacted; fair to good resistance to piping.	Slow to moderate seepage rate; shale bedrock at a depth of 48 to 72 inches.	Well drained	Bedrock at a depth of 48 to 72 inches.	Difficult to vegetate where fragipan is exposed.
Subsoil and underlying material: fair shear strength; fair to good stability; fair to good compaction characteristics; moderate shrink-swell potential; low permeability when compacted; good resistance to piping.	Moderate to slow seepage rate in underlying material.	Well drained	Soil features favorable.	Soil features favorable.
Subsoil: fair to poor shear strength; fair stability; fair to poor compaction characteristics; moderate shrink-swell potential; low permeability when compacted; subject to piping.	Moderate seepage through upper 6 to 8 feet of material; deeper excavations are likely to expose sandy and gravelly material and seepage is likely to be excessive.	Well drained	Soil features favorable.	Soil features favorable.
Subsoil and underlying material: fair to poor shear strength; fair to good stability; fair to good compaction characteristics; moderate shrink-swell potential; low permeability when compacted; good resistance to piping.	Slow seepage rate	Moderately well drained.	Soil features favorable.	Difficult to vegetate where fragipan is exposed.
Subsoil and underlying material: fair shear strength; fair stability; fair compaction characteristics; moderate shrink-swell potential; moderate to low permeability when compacted; fair resistance to piping.	Slow seepage rate; seasonal high water table; nearly level; suitable for dug-out ponds.	Poorly drained, water table at a depth of 0 to 1 foot; slow permeability.	Not needed, except to divert runoff from adjoining higher areas.	Generally not needed, except where a concentrated flow of runoff water comes from adjoining higher areas.
Subsoil and underlying material: fair shear strength; fair to good stability; fair to good compaction characteristics; low to moderate shrink-swell potential; low permeability when compacted; good resistance to piping.	Moderate to rapid seepage rate in the underlying material; subject to flooding.	Moderately well drained.	Not needed	Not needed, except where overflow water concentrates.
Subsoil and underlying material: fair shear strength; fair to good stability; fair to good compaction characteristics; moderate shrink-swell potential; low permeability when compacted; good resistance to piping.	Moderate to slow seepage rate.	Well drained	Soil features favorable.	Soil features favorable.

TABLE 9.—*Interpretations of the soils*

Soil series and map symbols	Suitability as a source of — Topsoil	Sand and gravel	Road fill	Soil features affecting highway location
Steff: St	Good in surface layer and subsoil: subject to flooding.	Unsuited	Fair to poor in subsoil and underlying material: poor shear strength; medium compressibility; poor to fair stability; poor compaction characteristics; low shrink-swell potential; high frost heave; subject to flooding.	Medium compressibility in subsoil; low shrink-swell potential; high frost heave; subject to flooding.
Stendal: Sx	Fair in surface layer and underlying material: seasonal high water table; subject to flooding.	Unsuited	Fair to poor in underlying material: poor shear strength; medium compressibility; poor to fair stability; poor compaction characteristics; low shrink-swell potential; high frost heave; subject to flooding; seasonal high water table.	Medium compressibility in subsoil; low shrink-swell potential; high frost heave; subject to flooding; seasonal high water table.
Trappist: TrC2, TrD2, TsC3, TsD3.	Good in surface layer: moderate in organic-matter content. Poor in subsoil: clayey.	Unsuited	Poor in subsoil: fair to poor shear strength; medium to high compressibility; fair to poor stability; fair to poor compaction characteristics; moderate to high shrink-swell potential; high frost heave; shale bedrock at a depth of 30 to 40 inches.	Medium to high compressibility in subsoil; moderate to high shrink-swell potential; high frost heave; shale bedrock below a depth of 30 to 40 inches; cuts and fills needed; cuts difficult to vegetate where shale is exposed.
Wakeland: Wa	Fair in surface layer and underlying material: low in organic-matter content; seasonal high water table; subject to flooding.	Unsuited	Fair to poor in underlying material: poor shear strength; medium compressibility; poor to fair stability; poor compaction characteristics; low shrink-swell potential; high frost heave; subject to flooding; seasonal high water table.	Medium compressibility; low shrink-swell potential; high frost heave; subject to flooding; seasonal high water table.
Weikert: WkE2	Very poor in surface and subsoil: shaly material; bedrock at a depth of 10 to 20 inches; moderately steep and steep slopes.	Unsuited	Poor in subsoil: rippable shale bedrock at a depth of 10 to 20 inches.	Rippable shale bedrock at a depth of 10 to 20 inches; moderately steep and steep; cuts and fills needed; cuts difficult to vegetate where shale is exposed.
Wilbur: Wu	Good in surface layer and underlying material: subject to flooding.	Unsuited	Fair to poor in underlying material: poor shear strength; medium compressibility; poor to fair stability; poor compaction characteristics; low to moderate shrink-swell potential; high frost heave; subject to flooding.	Medium compressibility; low to moderate shrink-swell potential; high frost heave; subject to flooding.

let. Features that affect suitability of a soil for terraces are uniformity and steepness of slope; depth to bedrock or other unfavorable material; presence of stones; permeability; and resistance to water erosion, soil slipping, and soil blowing. A soil suitable for these structures provides outlets for runoff and is not difficult to vegetate.

Grassed waterways are affected by soil properties that affect growth and maintenance of vegetation, and layout and construction.

Use of Soils for Town and Country Planning

Residential, commercial, industrial, and institutional developments are becoming more numerous as the suburbs of towns expand into the rural areas of Jennings County. In the past the rapid increase in the number of developments has led to many problems. These problems clearly show the need for careful planning and

for engineering uses—Continued

Soil features affecting —				
Dams, dikes, levees, and embankments	Pond reservoir areas	Drainage of cropland and pasture	Terraces and diversions	Grassed waterways
Subsoil and underlying material: poor shear strength; poor to fair stability; poor compaction characteristics; low shrink-swell potential; medium to low permeability when compacted; poor resistance to piping.	Slow to rapid seepage rate; variable textures in the underlying material; subject to flooding.	Moderately well drained.	Not needed, except to divert runoff from adjoining higher areas.	Generally not needed, except where a concentrated flow of runoff water comes from adjoining higher areas.
Underlying material: poor shear strength; poor compaction characteristics; low shrink-swell potential; medium to low permeability when compacted; poor resistance to piping.	Slow to moderate seepage rate; seasonal high water table; subject to flooding; suitable for dug-out ponds.	Somewhat poorly drained; water table at a depth of 1 to 3 feet.	Not needed, except to divert runoff from adjoining higher areas.	Generally not needed, except where a concentrated flow of runoff water comes from adjoining higher areas.
Subsoil: fair to poor shear strength; fair to poor stability; fair to poor compaction characteristics; moderate to high shrink-swell potential; low permeability when compacted; good resistance to piping; shale bedrock at a depth of 30 to 40 inches.	Slow seepage rate; shale at a depth of 30 to 40 inches.	Well drained	Shale bedrock at a depth of 30 to 40 inches.	Shale bedrock at a depth of 30 to 40 inches; difficult to vegetate.
Underlying material: poor shear strength; poor to fair stability; poor compaction characteristics; low shrink-swell potential; medium to low permeability when compacted; poor resistance to piping.	Slow to moderate seepage rate; seasonal high water table; subject to flooding; suitable for dug-out ponds.	Somewhat poorly drained; water table at a depth of 1 to 3 feet; moderate permeability.	Not needed, except to divert runoff from adjoining higher areas.	Generally not needed, except where a concentrated flow of runoff water comes from adjoining higher areas.
Subsoil: rippable shale bedrock at a depth of 10 to 20 inches.	Slow to moderate seepage; shallow to bedrock.	Well drained	Moderately steep and steep.	Moderately steep and steep.
Underlying material: poor shear strength; poor to fair stability; poor compaction characteristics; low shrink-swell potential; medium to low permeability when compacted; fair resistance to piping.	Slow to rapid seepage rate; variable textures in the underlying material; subject to flooding.	Moderately well drained.	Not needed, except to divert runoff from adjoining higher areas.	Generally not needed, except where a concentrated flow of runoff water comes from adjoining higher areas.

broad understanding of the physical and economic aspects involved when the use of land is changed.

This soil survey helps in planning these developments and in solving problems that arise as use of the land changes. Planning officials and developers, as well as homeowners and others, can find useful information on the soil maps, in the text, and in the tables in this survey. The detailed soil maps in the back of the survey are useful because they show the location of each of the soils in the county. The colored general soil map that precedes the detailed soil maps shows the pattern of the major soils within the county. All of the soils are discussed in detail in the section "Description of the Soils."

Table 10 gives the degree and kind of limitations to the use of soils in Jennings County for town and country planning. In this table, the soils are evaluated only to a depth of about 5 feet or less. They are rated on the basis of three classes of soil limitations. *Slight*

TABLE 10.—*Degree and kind of limitations*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds to follow carefully the instructions for referring to other

Soil series and map symbols	Sites for dwellings — With basements	Sites for dwellings — Without basements	Sites for commercial or light industrial development	Landscaping and lawns
Avonburg:				
AvA	Severe: somewhat poorly drained.	Moderate: somewhat poorly drained.	Moderate: somewhat poorly drained; seasonal high water table at a depth of 1 to 3 feet; fair to poor shear strength; moderate shrink-swell potential; medium to high compressibility.	Moderate: somewhat poorly drained; seasonal high water table at a depth of 1 to 3 feet; some shrubs not adapted; lawns damaged if used during wet periods.
AvB2	Severe: somewhat poorly drained.	Moderate: somewhat poorly drained.	Moderate: somewhat poorly drained; seasonal high water table at a depth of 1 to 3 feet; fair to poor shear strength; moderate shrink-swell potential; medium to high compressibility.	Moderate: somewhat poorly drained; seasonal high water table at a depth of 1 to 3 feet; some shrubs not adapted; lawns damaged if used during wet periods.
Bartle: Ba	Severe: somewhat poorly drained.	Moderate: somewhat poorly drained.	Moderate: somewhat poorly drained; seasonal high water table at a depth of 1 to 3 feet; fair to poor shear strength; low shrink-swell potential; medium to high compressibility.	Moderate: somewhat poorly drained; seasonal high water table at a depth of 1 to 3 feet; some shrubs not adapted; lawns damaged if used during wet periods.
Bonnie: Bo	Severe: poorly drained to very poorly drained; subject to flooding.	Severe: poorly drained to very poorly drained; subject to flooding.	Severe: poorly drained to very poorly drained; seasonal high water table at a depth of 0 to 1 foot; fair to poor shear strength; low shrink-swell potential; medium to high compressibility; subject to flooding.	Severe: subject to flooding; poorly drained to very poorly drained; seasonal high water table at a depth of 0 to 1 foot; floodwater may damage landscape plantings.
Brookston: Br	Severe: very poorly drained.	Severe: very poorly drained.	Severe: very poorly drained; seasonal high water table at a depth of 0 to 1 foot; fair shear strength; moderate to high shrink-swell potential; medium to high compressibility.	Severe: very poorly drained; seasonal high water table at a depth of 0 to 1 foot; some shrubs not adapted; lawns damaged if used during wet periods.
*Cincinnati:				
CnB2	Slight	Slight	Moderate: 2 to 6 percent slopes.	Slight
CnC2, CnC3, CoC2 For Rossmoyne part of CoC2, see Rossmoyne series.	Moderate: 6 to 12 percent slopes.	Moderate: 6 to 12 percent slopes.	Severe: 6 to 12 percent slopes.	Slight for CnC2 and CoC2; moderate for CnC3.
CnD2, CnD3	Severe: 12 to 18 percent slopes.	Severe: 12 to 18 percent slopes.	Severe: 12 to 18 percent slopes.	Moderate for CnD2; severe for CnD3: 12 to 18 percent slopes; hazard of runoff and erosion.
Clermont: Cr	Severe: poorly drained.	Severe: poorly drained.	Severe: poorly drained; seasonal high water table at a depth of 0 to 1 foot; fair shear strength; low shrink-swell potential; medium to high compressibility.	Severe: poorly drained; seasonal high water table at a depth of 0 to 1 foot; some shrubs not adapted; lawns damaged if used during wet periods.

of the soils for town and country planning

of soil. The soils in such mapping units may have different properties and limitations, and for this reason it is necessary series that appear in the first column of this table]

Local roads, streets, and parking lots	Septic tank absorption fields	Sewage lagoons	Sanitary landfills (trench type)
Moderate: somewhat poorly drained; seasonal high water table at a depth of 1 to 3 feet; high susceptibility to frost heave; moderate shrink-swell potential.	Severe: very slow permeability; seasonal high water table at a depth of 1 to 3 feet; estimated percolation rate slower than 60 minutes per inch.	Moderate: somewhat poorly drained.	Moderate: somewhat poorly drained; dominantly silty clay loam.
Moderate: somewhat poorly drained; seasonal high water table at a depth of 1 to 3 feet; high susceptibility to frost heave; moderate shrink-swell potential.	Severe: very slow permeability; seasonal high water table at a depth of 1 to 3 feet; estimated percolation rate slower than 60 minutes per inch.	Moderate to 4 percent slopes; somewhat poorly drained.	Moderate: somewhat poorly drained.
Moderate: somewhat poorly drained; seasonal high water table at a depth of 1 to 3 feet; high susceptibility to frost heave; low shrink-swell potential.	Severe: very slow permeability; seasonal high water table at a depth of 1 to 3 feet; estimated percolation rate slower than 60 minutes per inch.	Moderate: somewhat poorly drained.	Moderate: somewhat poorly drained.
Severe: poorly drained to very poorly drained; seasonal high water table at a depth of 0 to 1 foot; high susceptibility to frost heave; low shrink-swell potential; subject to flooding.	Severe: subject to flooding; slow permeability; seasonal high water table at a depth of 0 to 1 foot; estimated percolation rate slower than 60 minutes per inch.	Severe: subject to flooding	Severe: subject to flooding; poorly drained to very poorly drained.
Severe: very poorly drained; seasonal high water table at a depth of 0 to 1 foot; high susceptibility to frost heave; moderate to high shrink-swell potential.	Severe: very slow permeability; seasonal high water table at a depth of 0 to 1 foot; estimated percolation rate slower than 60 minutes per inch.	Severe: very poorly drained	Severe: very poorly drained
Slight for roads. Moderate for parking lots: 2 to 6 percent slopes.	Severe: very slow permeability; estimated percolation rate slower than 60 minutes per inch.	Moderate: 2 to 6 percent slopes.	Slight.
Moderate for roads. Severe for parking lots: 6 to 12 percent slopes.	Severe: very slow permeability; estimated percolation rate slower than 60 minutes per inch.	Severe: 6 to 12 percent slopes.	Slight.
Severe: 12 to 18 percent slopes hinder development of site.	Severe: very slow permeability; estimated percolation rate slower than 60 minutes per inch.	Severe: 12 to 18 percent slopes.	Moderate: 12 to 18 percent slopes.
Severe: poorly drained; seasonal high water table at a depth of 0 to 1 foot; high susceptibility to frost heave; low shrink-swell potential.	Severe: very slow permeability; seasonal high water table at a depth of 0 to 1 foot; estimated percolation rate slower than 60 minutes per inch.	Severe: poorly drained	Severe: poorly drained.

TABLE 10.—*Degree and kind of limitations of the*

Soil series and map symbols	Sites for dwellings — With basements	Sites for dwellings — Without basements	Sites for commercial or light industrial development	Landscaping and lawns
Corydon: CyF	Severe: bedrock at a depth of 10 to 20 inches; 25 to 40 percent slopes.	Severe: bedrock at a depth of 10 to 20 inches; 25 to 40 percent slopes.	Severe: bedrock at a depth of 10 to 20 inches; 25 to 40 percent slopes.	Severe: bedrock at a depth of 10 to 20 inches; 25 to 40 percent slopes hinder development of site; hazard of runoff and erosion.
Eel: Ee	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding	Moderate: subject to flooding; floodwater may damage landscape plantings.
Elkinsville:				
ElA	Slight	Slight	Slight	Slight
ElB2	Slight	Slight	Moderate: 2 to 6 percent slopes.	Slight
ElC2	Moderate: 6 to 12 percent slopes.	Moderate: 6 to 12 percent slopes.	Severe: 6 to 12 percent slopes.	Slight
*Fincastle:				
FcA	Severe: somewhat poorly drained.	Moderate: somewhat poorly drained.	Moderate: somewhat poorly drained; seasonal high water table at a depth of 1 to 3 feet; fair shear strength; moderate shrink-swell potential; medium to high compressibility.	Moderate: somewhat poorly drained; seasonal high water table at a depth of 1 to 3 feet; some shrubs not adapted; lawns damaged if used during wet periods.
FrB2 For Russell part of FrB2, see Russell series.	Severe: somewhat poorly drained.	Moderate: somewhat poorly drained.	Moderate: somewhat poorly drained; seasonal high water table at a depth of 1 to 3 feet; fair shear strength; moderate shrink-swell potential; medium to high compressibility.	Moderate: somewhat poorly drained; seasonal high water table at a depth of 1 to 3 feet; some shrubs not adapted; lawns damaged if used during wet periods.
Genesee: Ge	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding	Moderate: subject to flooding; floodwater may damage landscape plantings.
*Grayford:				
GfB2	Slight	Slight	Moderate: 2 to 6 percent slopes.	Slight
GfC2, GfC3	Moderate: 6 to 12 percent slopes.	Moderate: 6 to 12 percent slopes.	Severe: 6 to 12 percent slopes.	Slight for GfC2. Moderate for GfC3.
GfD2, GfD3, GoE2 For Corydon part of GoE2, see Corydon series.	Severe: slopes more than 12 percent.	Severe: slopes more than 12 percent.	Severe: slopes more than 12 percent.	Moderate for GfD2 and GoE2. Severe for GfD3: slopes more than 12 percent; hazard of runoff and erosion.

soils for town and country planning—Continued

Local roads, streets, and parking lots	Septic tank absorption fields	Sewage lagoons	Sanitary landfills (trench type)
Severe: bedrock at a depth of 10 to 20 inches; 25 to 40 percent slopes hinder development of site.	Severe: bedrock at a depth of 10 to 20 inches; 25 to 40 percent slopes; moderately slow permeability; estimated percolation rate slower than 60 minutes per inch.	Severe: bedrock at a depth of 10 to 20 inches; 25 to 40 percent slopes.	Severe: bedrock at a depth of 10 to 20 inches; 25 to 40 percent slopes.
Severe: subject to flooding; high susceptibility to frost heave.	Severe: subject to flooding; moderate permeability; estimated percolation rate faster than 45 minutes per inch.	Severe: subject to flooding	Severe: subject to flooding.
Slight	Slight	Moderate: moderate permeability.	Slight.
Slight for roads. Moderate for parking lots: 2 to 6 percent slopes.	Slight	Moderate: moderate permeability; 2 to 6 percent slopes.	Slight.
Moderate for roads. Severe for parking lots: 6 to 12 percent slopes.	Moderate: 6 to 12 percent slopes; moderate permeability; estimated percolation rate faster than 45 minutes per inch.	Severe: 6 to 12 percent slopes.	Slight.
Moderate: somewhat poorly drained; seasonal high water table at a depth of 1 to 3 feet; high susceptibility to frost heave; moderate shrink-swell potential.	Severe: slow permeability; seasonal high water table at a depth of 1 to 3 feet; estimated percolation rate slower than 60 minutes per inch.	Moderate: somewhat poorly drained.	Moderate: somewhat poorly drained.
Moderate: somewhat poorly drained; seasonal high water table at a depth of 1 to 3 feet; high susceptibility to frost heave; moderate shrink-swell potential.	Severe: slow permeability; seasonal high water table at a depth of 1 to 3 feet; estimated percolation rate slower than 60 minutes per inch.	Moderate: somewhat poorly drained; moderate permeability.	Moderate: somewhat poorly drained.
Severe: subject to flooding; moderate susceptibility to frost heave.	Severe: subject to flooding; moderate permeability; estimated percolation rate faster than 45 minutes per inch.	Severe: subject to flooding	Severe: subject to flooding.
Slight for roads. Moderate for parking lots: 2 to 6 percent slopes.	Slight[1]	Moderate: moderate permeability; 2 to 6 percent slopes.	Moderate: dominantly silty clay loam and clay loam.
Moderate for roads. Severe for parking lots: 6 to 12 percent slopes.	Moderate: 6 to 12 percent slopes; possible contamination of ground water; moderate permeability; estimated percolation rate 45 to 60 minutes per inch.	Severe: 6 to 12 percent slopes.	Moderate: dominantly silty clay loam and clay loam.
Severe: slopes more than 12 percent hinder development of site.	Severe: slopes more than 12 percent.	Severe: slopes more than 12 percent.	Moderate: dominantly silty clay loam and clay loam; 12 to 25 percent slopes.

TABLE 10.—*Degree and kind of limitations of the*

Soil series and map symbols	Sites for dwellings — With basements	Sites for dwellings — Without basements	Sites for commercial or light industrial development	Landscaping and lawns
Gullied land: Gu. Too variable for reliable estimates to be made.				
Haymond: Ha	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding	Moderate: subject to flooding; floodwater may damage landscape plantings.
Hickory: HkE2, HkF	Severe: slopes more than 18 percent.	Severe: slopes more than 18 percent.	Severe: slopes more than 18 percent.	Severe: slopes more than 18 percent hinder development of site; hazard of runoff and erosion.
Jennings: JnB2	Slight	Slight	Moderate: 2 to 6 percent slopes.	Slight
JnC2, JnC3	Moderate: 6 to 12 percent slopes.	Moderate: 6 to 12 percent slopes.	Severe: 6 to 12 percent slopes.	Slight for JnC2. Moderate for JnC3.
JnD2, JnD3	Severe: 12 to 18 percent slopes.	Severe: 12 to 18 percent slopes.	Severe: 12 to 18 percent slopes.	Moderate for JnD2. Severe for JnD3: 12 to 18 percent slopes; hazard of runoff and erosion.
Miami: MmC2, MoC3	Moderate: 6 to 12 percent slopes.	Moderate: 6 to 12 percent slopes.	Severe: 6 to 12 percent slopes.	Slight for MmC2. Moderate for MoC3.
MmD2	Severe: 12 to 18 percent slopes.	Severe: 12 to 18 percent slopes.	Severe: 12 to 18 percent slopes.	Moderate: 12 to 18 percent slopes; hazard of runoff and erosion.
Parke: PaB2	Slight	Slight	Moderate: 2 to 6 percent slopes.	Slight
PaC2, PaC3	Moderate: 6 to 12 percent slopes.	Moderate: 6 to 12 percent slopes.	Severe: 6 to 12 percent slopes.	Slight for PaC2. Moderate for PaC3.
Pekin: PcA, PcB2	Moderate: moderately well drained.	Slight	Slight	Slight
PcC2	Moderate: moderately well drained; 6 to 10 percent slopes.	Moderate: 6 to 10 percent slopes.	Severe: 6 to 10 percent slopes.	Slight
Peoga: Pe	Severe: poorly drained.	Severe: poorly drained.	Severe: poorly drained; seasonal high water table at a depth of 0 to 1 foot; fair shear strength; moderate shrink-swell potential; medium to high compressibility.	Severe: poorly drained; seasonal high water table at a depth of 0 to 1 foot; some shrubs not adapted; lawns damaged if used during wet periods.

soils for town and country planning—Continued

Local roads, streets, and parking lots	Septic tank absorption fields	Sewage lagoons	Sanitary landfills (trench type)
Severe: subject to flooding; moderate susceptibility to frost heave.	Severe: subject to flooding; moderate permeability; estimated percolation rate faster than 45 minutes per inch.	Severe: subject to flooding	Severe: subject to flooding.
Severe: slopes more than 18 percent hinder development of site.	Severe: slopes more than 18 percent.	Severe: slopes more than 18 percent.	Moderate for HkE2: 18 to 25 percent slopes. Severe for HkF: 25 to 50 percent slopes.
Slight for roads. Moderate for parking lots: 2 to 6 percent slopes.	Severe: very slow permeability; estimated percolation rate slower than 60 minutes per inch.	Moderate: 2 to 6 percent slopes.	Severe: bedrock at a depth of 48 to 72 inches.
Moderate for roads. Severe for parking lots: 6 to 12 percent slopes.	Severe: very slow permeability; estimated percolation rate slower than 60 minutes per inch.	Severe: 6 to 12 percent slopes.	Severe: bedrock at a depth of 48 to 72 inches.
Severe: 12 to 18 percent slopes hinder development of site.	Severe: very slow permeability; estimated percolation rate slower than 60 minutes per inch; 12 to 18 percent slopes.	Severe: 12 to 18 percent slopes.	Severe: bedrock at a depth of 48 to 72 inches.
Moderate for roads. Severe for parking lots; 6 to 12 percent slopes.	Moderate: 6 to 12 percent slopes; moderate permeability; estimated percolation rate 45 to 60 minutes per inch.	Severe: 6 to 12 percent slopes.	Slight.
Severe: 12 to 18 percent slopes hinder development of site.	Severe: 12 to 18 percent slopes; moderate permeability; estimated percolation rate 45 to 60 minutes per inch.	Severe: 12 to 18 percent slopes.	Moderate: 12 to 18 percent slopes.
Slight for roads. Moderate for parking lots: 2 to 6 percent slopes.	Slight	Severe: porous sand and gravel below a depth of 5 feet.	Moderate: dominantly silty clay loam and clay loam.
Moderate for roads. Severe for parking lots: 6 to 12 percent slopes.	Moderate: 6 to 12 percent slopes; moderate permeability; estimated percolation rate 45 to 60 minutes per inch.	Severe: porous sand and gravel below a depth of 5 feet.	Moderate: dominantly silty clay loam and clay loam.
Slight for roads. Moderate for parking lots: 2 to 6 percent slopes.	Severe: very slow permeability; seasonal high water table at a depth of 3 to 6 feet; estimated percolation rate slower than 60 minutes per inch.	Slight for PcA. Moderate for PcB2: 2 to 6 percent slopes.	Slight.
Moderate for roads. Severe for parking lots: 2 to 10 percent slopes.	Severe: very slow permeability; seasonal high water table at a depth of 3 to 6 feet; estimated percolation rate slower than 60 minutes per inch.	Severe: 6 to 10 percent slopes.	Slight.
Severe: poorly drained; seasonal high water table at a depth of 0 to 1 foot; high susceptibility to frost heave; moderate shrink-swell potential.	Severe: slow permeability; seasonal high water table at a depth of 0 to 1 foot; estimated percolation rate slower than 60 minutes per inch.	Severe: poorly drained	Severe: poorly drained.

TABLE 10.—*Degree and kind of limitations of the*

Soil series and map symbols	Sites for dwellings—		Sites for commercial or light industrial development	Landscaping and lawns
	With basements	Without basements		
Rossmoyne:				
RsA	Moderate: moderately well drained.	Slight	Slight	Slight
RsB2, RsB3	Moderate: moderately well drained.	Slight	Moderate: 2 to 6 percent slopes:	Slight for RsB2. Moderate for RsB3.
Russell. Mapped only in a complex with Fincastle soils.	Slight	Slight	Moderate: 2 to 6 percent slopes.	Slight
Steff: St	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding	Moderate: subject to flooding; floodwater may damage landscape plantings.
Stendal: Sx	Severe: subject to flooding; somewhat poorly drained.	Severe: subject to flooding.	Severe: subject to flooding	Severe: subject to flooding; somewhat poorly drained; seasonal high water table at a depth of 1 to 3 feet; floodwater may damage landscape plantings.
Trappist:				
TrC2, TsC3	Severe: bedrock at a depth of 30 to 40 inches.	Moderate: bedrock at a depth of 30 to 40 inches; 6 to 12 percent slopes.	Moderate: bedrock at a depth of 30 to 40 inches; 6 to 12 percent slopes; fair to poor shear strength; moderate to high shrink-swell potential; medium to high compressibility.	Slight for TrC2. Moderate for TsC3.
TrD2, TsD3	Severe: bedrock at a depth of 30 to 40 inches; 12 to 18 percent slopes.	Severe: 12 to 18 percent slopes.	Severe: bedrock at a depth of 30 to 40 inches; 12 to 18 percent slopes.	Moderate for TrD2. Severe for TsD3: 12 to 18 percent slopes; hazard of runoff and erosion.
Wakeland: Wa	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding	Severe: subject to flooding; somewhat poorly drained; seasonal high water table at a depth of 1 to 3 feet; floodwater may damage landscape plantings.
Weikert: WkE2	Severe: bedrock at a depth of 10 to 20 inches; 18 to 40 percent slopes.	Severe: bedrock at a depth of 10 to 20 inches; 18 to 40 percent slopes.	Severe: bedrock at a depth of 10 to 20 inches; 18 to 40 percent slopes.	Severe: bedrock at a depth of 10 to 20 inches; 18 to 40 percent slopes hinder development of site; hazard of runoff and erosion.
Wilbur: Wu	Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding	Moderate: subject to flooding

[1] Possible contamination of ground water.

means that, for the intended use, the soil is relatively free of limitations and the facility is easily created, improved, or maintained. *Moderate* means that limitations need to be recognized, but they can be overcome with good management and careful design. *Severe* means that limitations are severe enough to make the intended use questionable and extreme measures are needed to overcome limitations.

In the following paragraphs, each town and country planning use is defined, and the properties that are important in rating the limitations for such purposes are given. This information can be used with information in other parts of the survey as a guide in the use of soils for town and country planning. Before any construction projects begin, an investigation should be made of the soils at the site considered.

soils for town and country planning—Continued

Local roads, streets, and parking lots	Septic tank absorption fields	Sewage lagoons	Sanitary landfills (trench type)
Slight	Severe: very slow permeability; seasonal high water table at a depth of 3 to 6 feet; estimated percolation rate slower than 60 minutes per inch.	Slight	Slight.
Slight for roads. Moderate for parking lots: 2 to 6 percent slopes.	Severe: very slow permeability; seasonal high water table at a depth of 3 to 6 feet; estimated percolation rate slower than 60 minutes per inch.	Moderate: 2 to 6 percent slopes.	Slight.
Slight for roads. Moderate for parking lots: 2 to 6 percent slopes.	Moderate: moderate permeability; estimated percolation rate 45 to 60 minutes per inch.	Moderate: moderate permeability; 2 to 6 percent slopes.	Moderate: dominantly silty clay loam and clay loam.
Severe: subject to flooding; high susceptibility to frost heave.	Severe: subject to flooding; moderate permeability; estimated percolation rate faster than 45 minutes per inch.	Severe: subject to flooding	Severe: subject to flooding.
Severe: subject to flooding; somewhat poorly drained; seasonal high water table at a depth of 1 to 3 feet; high susceptibility to frost heave.	Severe: subject to flooding; moderate permeability; seasonal high water table at a depth of 1 to 3 feet; estimated percolation rate faster than 45 minutes per inch.	Severe: subject to flooding	Severe: subject to flooding.
Moderate for roads. Severe for parking lots: 6 to 12 percent slopes.	Severe: bedrock at a depth of 30 to 40 inches; slow permeability; estimated percolation rate slower than 60 minutes per inch.	Severe: bedrock at a depth of 30 to 40 inches; 6 to 12 percent slopes.	Moderate: bedrock at a depth of 30 to 40 inches.
Severe: 12 to 18 percent slopes hinder development of site.	Severe: bedrock at a depth of 30 to 40 inches; slow permeability; estimated percolation rate slower than 60 minutes per inch; 12 to 18 percent slopes.	Severe: bedrock at a depth of 30 to 40 inches; 12 to 18 percent slopes.	Severe: bedrock at a depth of 30 to 40 inches.
Severe: subject to flooding; somewhat poorly drained; seasonal high water table at a depth of 1 to 3 feet; high susceptibility to frost heave.	Severe: subject to flooding; moderate permeability; seasonal high water table at a depth of 1 to 3 feet; estimated percolation rate faster than 45 minutes per inch.	Severe: subject to flooding	Severe: subject to flooding.
Severe: bedrock at a depth of 10 to 20 inches; 18 to 40 percent slopes hinder development of site.	Severe: bedrock at a depth of 10 to 20 inches; 18 to 40 percent slopes; moderately rapid permeability; estimated percolation rate faster than 45 minutes per inch.	Severe: bedrock at a depth of 10 to 20 inches; 18 to 40 percent slopes.	Severe: bedrock at a depth of 10 to 20 inches; 18 to 40 percent slopes.
Severe: subject to flooding; high susceptibility to frost heave.	Severe: subject to flooding	Severe: subject to flooding	Severe: subject to flooding.

Sites for single family dwellings of three stories or less are evaluated to a depth of 5 feet. Soils are important in the construction and maintenance of building foundations and basements. For dwellings with basements, such features as the cost of excavation, bearing strength of the foundation, and drainage are emphasized.

A properly constructed basement not only supports the building without undue settling and cracking but is also dry throughout the year. Sound construction techniques should provide adequate drainage around the foundation or footings to prevent undue settlement and wet basements. Also considered are factors that influence installation of utility lines, such as the characteristics of soils between the dwellings and trunk lines.

Among the soil characteristics affecting construction of dwellings are internal drainage, hazard of flooding, depth to bedrock, and slopes. Onsite investigations are needed for specific placement of buildings and utility lines and for detailed design of foundations. Interpretations for landscaping and lawns, roads, and streets, and septic tank absorption fields are provided in other columns of this table.

Sites for commercial or light industrial development are evaluated for buildings of three stories or less. Soils are important in the construction and maintenance of building foundations. The degree of limitation for the soil is dependent, in part, on the cost of excavation, bearing strength of the foundation, and drainage. Sound construction techniques provide adequate drainage around the foundation or footings to prevent undue settlement. Among the soil characteristics that affect industrial or commercial sites are internal drainage, depth to seasonal high water table, depth to bedrock, slope, hazard of flooding or ponding, shear strength, shrink-swell potential, and compressibility. Disposal of effluent from septic tank fields was not considered.

Landscaping and lawns are important in most residential areas and around many commercial sites. Some soil characteristics may limit usage of soil for landscaping and lawns but not for building purposes. Some problems can be overcome or dealt with, if the limitations are understood. Soil characteristics affecting the establishment and maintenance of lawns and shrubs are slope, internal drainage, depth to seasonal high water table, hazard of flooding and ponding, available water capacity, droughtiness, erodibility of soil, depth to bedrock, and slope.

Local roads, streets, and parking lots are expected to carry automobile traffic all year. They have an underlying local soil material, either cut or fill, called the road subgrade; a base consisting of gravel, crushed rock, or a soil material stabilized with lime or cement; and the actual road surface, generally asphalt or concrete, called the pavement. The subgrades for roads, streets, and parking lots are built mainly from the soil at hand. Cuts and fills are generally limited to a depth of less than 6 feet. Among the soil characteristics that affect construction are internal drainage, depth to seasonal high water table, depth to bedrock, slope, hazard of flooding or ponding, susceptibility to frost heave, and shrink-swell potential.

Septic tank absorption fields are used to dispose of sewage where central sewage treatment is not available. A well designed system consists of a septic tank for holding solid wastes, a distribution box for dispensing effluent, and a tile disposal field. Successful operation of the entire system depends upon the ability of soils to absorb and filter the liquid effluent that passes through the tile field. Soil characteristics that impair proper absorption and filtering of effluent cause health hazards as well as a public nuisance. Among the soil characteristics that affect the operation of the tile absorption field are permeability, depth to seasonal high water table, depth to bedrock, slope, and hazard of flooding or ponding.

Sewage lagoons are shallow lakes used to hold sewage during the time required for bacterial decomposition. A suitable site should provide an impoundment area and enough soil material to make the dam structure. The completed lagoon must be able to hold water with only minimum seepage and no contamination of water supply. Soil characteristics affecting sewage lagoons are internal drainage, depth to seasonal high water table, slope, depth to bedrock, coarse fragments, hazard of flooding or ponding, permeability, and organic-matter content.

Sanitary landfills are disposal areas for trash and garbage. The soils are rated for the trench type of landfill; thus, hauling of cover material is unnecessary. A good sanitary landfill should operate without contaminating the water supply, reducing esthetic land values, or causing health hazards. In addition, it should be usable during all seasons of the year. Fill areas that have been adequately compacted and covered can be used for parking areas, parks, recreation areas, and other valuable purposes. Among the soil characteristics affecting the operation of a sanitary landfill are internal drainage, depth to bedrock, slope, hazard of flooding or ponding, soil texture, and permeability.

Routine soil investigations are normally confined to depths of about 5 or 6 feet, but many landfill trenches are as deep as 15 feet or more. Therefore, there is a need for geologic investigation of the area to determine the potential for polluting ground water as well as to obtain the design of the landfill. The soil survey is a valuable tool in selecting potential sites and determining where additional investigations are warranted.

Formation, Morphology, and Classification of the Soils

This section tells how the five major factors of soil formation have affected the formation of soils in Jennings County, discusses the soil-forming processes, and explains the system of soil classification currently used. Table 11 shows the placement of each soil series in higher categories of that system.

Factors of Soil Formation

Soil is produced by the action of soil-forming processes on materials deposited or accumulated through natural processes. The characteristics of the soil at any given point are determined by (1) the physical and mineralogical composition of the parent material; (2) the climate under which the soil material has accumulated and existed since accumulation; (3) the plant and animal life on and in the soil; (4) the relief, or lay of the land; and (5) the length of time the processes of soil development have been active.

Climate and plant and animal life, but chiefly plants, are active factors of soil formation. They act on the parent material that has accumulated through the weathering of rocks and slowly change it to a natural body that has genetically related horizons. The effect of climate and plant and animal life are conditioned by relief. The parent material also affects the kind of soil profile that can form and, in extreme cases, determines it almost entirely. Finally, time is needed for changing the parent material into a soil profile. The amount of time may be short or long, but some time is always

TABLE 11.—*Classification of soil series*

Series	Family	Subgroup	Order
Avonburg	Fine-silty, mixed, mesic	Aeric Fragiaqualfs	Alfisols.
Bartle	Fine-silty, mixed, mesic	Aeric Fragiaqualfs	Alfisols.
Bonnie	Fine-silty, mixed, acid, mesic	Typic Fluvaquents	Entisols.
Brookston	Fine-loamy, mixed, mesic	Typic Argiaquolls	Mollisols.
Cincinnati	Fine-silty, mixed, mesic	Typic Fragiudalfs	Alfisols.
Clermont	Fine-silty, mixed, mesic	Typic Ochraqualfs	Alfisols.
Corydon	Clayey, mixed, mesic	Lithic Argiudolls	Mollisols.
Eel[1]	Fine-loamy, mixed, nonacid, mesic	Aquic Udifluvents	Entisols.
Elkinsville	Fine-silty, mixed, mesic	Ultic Hapludalfs	Alfisols.
Fincastle	Fine-silty, mixed, mesic	Aeric Ochraqualfs	Alfisols.
Genesee[1]	Fine-loamy, mixed, nonacid, mesic	Typic Udifluvents	Entisols.
Grayford	Fine-silty, mixed, mesic	Typic Hapludalfs	Alfisols.
Haymond	Coarse-silty, mixed, nonacid, mesic	Typic Udifluvents	Entisols.
Hickory	Fine-loamy, mixed, mesic	Typic Hapludalfs	Alfisols.
Jennings	Fine-silty, mixed, mesic	Typic Fragiudults	Ultisols.
Miami	Fine-loamy, mixed, mesic	Typic Hapludalfs	Alfisols.
Parke	Fine-silty, mixed, mesic	Ultic Hapludalfs	Alfisols.
Pekin	Fine-silty, mixed, mesic	Aquic Fragiudalfs	Alfisols.
Peoga	Fine-silty, mixed, mesic	Typic Ochraqualfs	Alfisols.
Rossmoyne	Fine-silty, mixed, mesic	Aquic Fragiudalfs	Alfisols.
Russell	Fine-silty, mixed, mesic	Typic Hapludalfs	Alfisols.
Steff[1]	Fine-silty, mixed, mesic	Fluvaquentic Dystrochrepts.	Inceptisols.
Stendal	Fine-silty, mixed, acid, mesic	Aeric Fluvaquents	Entisols.
Trappist	Clayey, mixed, mesic	Typic Hapludults	Ultisols.
Wakeland	Coarse-silty, mixed, nonacid, mesic	Aeric Fluvaquents	Entisols.
Weikert	Loamy-skeletal, mixed, mesic	Lithic Dystrochrepts	Inceptisols.
Wilbur	Coarse-silty, mixed, nonacid, mesic	Aquic Udifluvents	Entisols.

[1] In Jennings County the following soils are taxadjuncts to the series for which they are named:
Eel and Genesee soils have a slightly more acid solum than is within the range defined for the Eel and Genesee series.
Steff soils lack a cambic horizon and, consequently, are not within the range defined for the series.
These differences do not alter the usefulness and behavior of these soils.

required for soil horizons to form. Usually, a long time is required for the development of distinct horizons.

The factors of soil formation are so closely interrelated in their effects on the soil that few generalizations can be made regarding the effect of any one factor unless conditions are specified for the other four. Many of the processes of soil development are unknown.

Parent material

Parent material influences the textural, chemical, and mineralogical properties of soils, and in Jennings County it is extremely variable. It consists of glacial till and outwash of Illinoian age; lacustrine deposits, or lakebed material, of Illinoian age; glacial till of Wisconsin age; residuum from limestone and from shale; alluvium; and loess (windblown silt).

Before the Illinoian glacier, this area was cut by streams and this preglacial topography determined the most important features of the present land surface. Most of the area was invaded by glacial ice from the north. Ice erosion acting on this landscape rounded the existing hills, deepened the valleys, and steepened the valley walls.

As the ice receded from the uplands, a mantle of glacial till, which consisted of mixed stones, sand, silt, and clay, remained over the bedrock. The melting ice produced a large volume of water that carried large amounts of sand and gravel, which was deposited in stratified layers (glacial outwash).

The till on the ridges and slopes ranges from a few inches to more than 10 feet in depth, but the till in the valleys is much deeper. In parts of the area where glacial ice carried debris only short distances, the mantle of till is thin and came mostly from underlying rock. In the areas where glacial drift is deeper it consists of material that was carried mainly hundreds of miles from northern areas. Cincinnati and Miami soils are examples of those that developed in glacial till.

When the ice receded, lakes were formed in many of the valleys that were blocked by glacial drift or rock divides. In these temporary glacial lakes, only material of clay and silt size settled out from the fast-moving water that came from the melting ice.

In unglaciated areas, which are predominantly in the western part of the county, the soils developed in material weathered from the underlying bedrock. The sedimentary rocks consist of alternate layers of limestone and shale and range from a few feet to several hundred feet in thickness. These formations have a gentle, downward tilt toward the west.

Different ages and formations of rock are exposed in Jennings County. In the eastern part limestone of Silurian age is exposed. The Corydon and Grayford soils formed in material weathered from this limestone. West of the Silurian limestone, and throughout the western part of Jennings County, black shale and limestone of Devonian age are exposed. The Trappist and Weikert soils are samples of soils that formed in material weathered from black shale.

Sediments deposited by water are the parent material of soils on bottom lands and terraces along the many natural drainageways that dissect the survey area. Haymond soils, which are on bottom lands, and

Bartle soils, which are on terraces, are examples of soils that formed in this material.

A thin mantle of loess has been deposited over most of the survey area, and consequently the upper part of most of the soils has formed in this silty parent material. The point of contact between the loess and the underlying residuum is generally distinct and easily distinguishable in road cuts and other places where soil profiles are exposed. The Grayford and Jennings soils are examples of soils that have a thin mantle of loess *(4, 5)*.

Figure 14 shows the relationship of parent material, underlying bedrock, and position of the soils.

Climate

The climate in Jennings County is midcontinental, and great contrasts in temperature occur. Daily maximum temperatures average 88° F in July, and daily minimum temperatures average to 22° F in January.

Precipitation averages 43.9 inches annually. It is rather evenly distributed throughout the year, but it is slightly greater in the spring and early in summer than in fall. The heavy rainfall has leached plant nutrients from the surface soil and has kept free calcium carbonate from accumulating.

The climate is so uniform throughout the area that differences among the soils cannot be explained on the basis of differences in climate.

Climate forces weather rocks to parent materials from which soils are formed, but many of the more important soil characteristics would not develop except for the activity of living organisms. Lacking the changes brought about by these organisms, the soils would consist only of residual or transported materials derived from weathered rock, but some soils might have definite layers formed by additions of alluvial materials.

Climate acting alone on parent materials would be largely destructive. It would cause the soluble materials to be washed out of the soils. However, when combined with the activities of plants and animals, the processes of climate become constructive. A reversible cycle is established between intake and outgo of plant nutrients. Plants draw nutrients from the lower part of the soil profile; then when the plants die, the surface soil is renewed in varying degrees by the plant nutrients that are returned to the upper part of the soil. In Jennings County the climate is such that leaching is greater than replacement, and consequently, most of the soils are strongly weathered, leached, acid, and of low fertility. Examples of such soils are those of the Jennings and Trappist series.

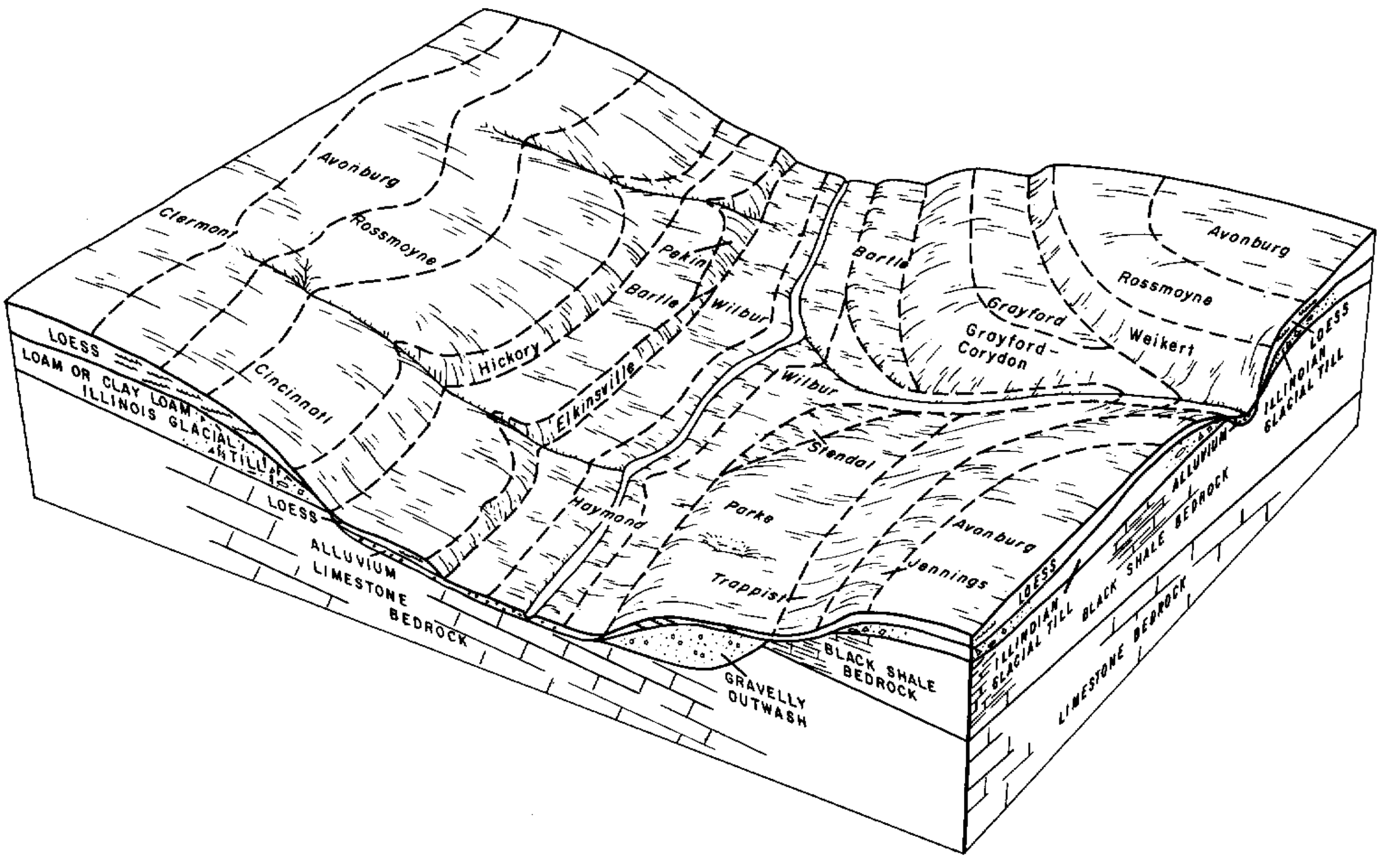

Figure 14.— **Relationship of parent material, underlying bedrock, and position of soils.**

Plant and animal life

Before the survey area was settled, the native vegetation was most important in the complex of living organisms that affected soil development. Higher plants, microorganisms, earthworms, and other forms of life that live on and in the soil also contribute to its morphology. Bacteria and fungi are the microorganisms that affect the soils. They cause raw plant waste to decompose into organic matter and to be incorporated into the soil. The higher plants return organic matter to the soil and bring moisture and plant nutrients from the lower part of the profile to the upper part.

The native vegetation of the area consists largely of hardwood trees. The most common trees are tulip-poplar, oak, hickory, elm, maple, and ash. In forest areas that have never been cleared, comparatively small amounts of organic matter, which occurs as thin layers of forest litter and leaf mold, cover the soil, and a small amount of organic matter derived from decayed leaves and twigs is mixed throughout the upper 1 or 2 inches of the surface layer. In areas of Brookston soils the native vegetation included swamp grasses and sedges as well as water-tolerant trees. These soils were covered with water much of the year, and as the organic material fell, it decayed slowly and some accumulation took place.

Since the vegetation is fairly uniform throughout the survey area, major differences in the soils cannot be explained on the basis of difference in vegetation. Although some comparatively minor variations in the vegetation are associated with the different soils, these variations are probably chiefly the result, and not the cause, of the differences in the soils.

Relief and drainage

The relief in Jennings County ranges from nearly level on bottom lands, terraces, and upland flats to very steep on breaks and hillsides. Much of the area has been highly dissected by weathering and stream cutting. Variations in relief have affected drainage and the development of the soils in the survey area. Relief influences soil formation mainly through its controlling effect upon drainage, runoff, normal and accelerated erosion, and other action of water. In Jennings County differences in relief have radically affected moisture and air conditions within the soil. Soil profiles that formed in the same parent materials are not so strongly developed in steep areas as they are in level to moderately sloping areas. This difference in soil development is caused by rapid or abnormal erosion, reduced percolation of water through the soil, and lack of sufficient water in the soil for vigorous growth of plants. The degree of profile development taking place within a given time or given parent material and under the same type of vegetation depends largely on the amount of water passing through the soil.

Because of the variation in relief in Jennings County, several different soils have formed in the same parent material. A good example of this is the Cincinnati catena of soils that formed in loess-capped glacial till. In this catena, the Avonburg soils are nearly level, somewhat poorly drained soils that are mottled light yellowish brown or gray in the upper part of the subsoil. The Rossmoyne soils are gently sloping, are moderately well drained, are yellowish brown in the upper part of the subsoil, and have some mottling. The Cincinnati soils are moderately sloping to strongly sloping, are well drained, and are dark brown in the upper part of the subsoil.

The White River in Jackson and Bartholomew Counties has many tributaries that make up the entire drainage in Jennings County. The Muscatatuck River, the largest tributary and boundary between Jennings and Scott Counties, drains the southern part of Jennings County. Sand Creek drains the northern part of Jennings County. Both of these streams flow toward the west.

The lower part of these streams, in the western part of Jennings County, are subject to occasional flooding. The upper parts of these streams, in the eastern part of the county, are bordered by narrow bottoms that are also subject to occasional flooding that is of shorter duration.

Other small streams in the survey area are tributaries of these creeks. They are bordered by narrow bottoms surrounded by moderately sloping to very steep, short slopes, or limestone bluffs. Soils of the Haymond, Wilbur, and Wakeland series occupy most of these narrow bottoms.

Time

Differences in length of time account for most of the soil differences not attributable to the other factors of soil formation. The soils of Jennings County range from very old to very young. In general, the older soils have a greater degree of horizon differentiation than the young soils.

Most soils that formed on the smoother parts of the uplands and on older stream terraces have a well-defined soil profile. These soils are old, or mature. They formed in materials that are less resistant to weathering or that have been in place long enough for distinct horizons to develop.

The soils on first bottoms and local alluvial soils are immature because the parent materials are young and new materials are deposited periodically. Soils that are steep are also likely to be immature because geological erosion removes the soil material nearly as rapidly as it accumulates, because runoff is greater, and because less water percolates down through the soil. Some kinds of parent rock are so resistant to weathering that soil formation is very slow even though other factors are favorable. A mature soil has well developed A and B horizons that were produced by the natural processes of soil formation. An immature soil has little or no horizon differentiation.

In Jennings County the oldest soils weathered from residual shale and limestone. Examples are the Trappist soils that formed in loess and shale residuum and the Grayford soils that formed from loess, till, and limestone residuum.

The next oldest soils are those formed in glacial till of Illinoian age, such as the Cincinnati and Rossmoyne soils that formed more than 200,000 years ago. They have well developed profiles and are considered to be mature or nearly so.

The soils derived from old alluvium formed in deposits of the Illinoian Age drift deposited more than 50,000 years ago. These old alluvial soils are along the valleys of the larger streams. They are not so thoroughly nor so deeply leached as soils developed in residual material, but they have been leached more than soils formed in the more recent glacial till of Wisconsin age. These are Peoga, Bartle, Pekin, and Elkinsville soils.

In the northwestern corner of the county, the Miami and Fincastle soils formed in loess and glacial till of Wisconsin Age deposited about 12,000 to 22,000 years ago. These soils are less thoroughly and less deeply leached than those formed in glacial till of Illinoian age.

Some young soils are shallow residual soils, such as the Corydon and Weikert soils. They are, for the most part, in steep areas where natural erosion is nearly as rapid as soil formation. Other young soils, such as Haymond and Genesee soils, are on bottom lands, where new materials are deposited periodically.

Morphology of Soils

Some of the processes involved in the formation of horizons in the soils of this area are (1) the accumulation of organic matter; (2) the solution, transfer, and reprecipitation of calcium carbonates and bases; (3) the liberation, reduction, and transfer of iron; and (4) the formation and translocation of silicate clay materials. In most soils, more than one of these processes have been active in the development of horizons.

The accumulation of organic matter in the upper part of the profile is important in the formation of an A1 horizon. In general, the soils that have the most organic matter have the thickest or darkest surface horizons and produce the most grass in the natural environment.

Carbonates and bases have been leached from the upper horizons of nearly all of the soils of the area. This leaching has contributed to the development of horizons, and soil scientists generally agree, the removal of carbonates from the upper horizons of a soil generally precedes the translocation of silicate clay minerals.

The clay accumulates in pores and it forms films on the surface along which water moves. In the soils of Jennings County the leaching of bases and the translocation of silicate clays are among the more important processes in horizon differentiation. The Cincinnati, Jennings, and Trappist soils are examples of soils that have translocated silicate clays accumulated in the form of clay films in the B2t horizon.

The reduction and transfer of iron, a process called gleying, is evident in the poorly drained Clermont and the very poorly drained Brookston soils. The gray color in the subsoil indicates the reduction and loss of iron. Some horizons have mottles, which indicates segregation of iron.

Classification of the Soils

Soils are classified so that we can more easily remember their significant characteristics. Classification enables us to assemble knowledge about the soils, to establish their relationship to one another and to the whole environment, and to develop principles that help us understand their behavior and their response to manipulation. First through classification, and then through the use of soil maps, we can apply our knowledge of soils to specific fields and other tracts of land.

Thus, in classification, soils are placed in narrow classes that are used in detailed soil surveys so that knowledge about the soils can be organized and used in managing farms, fields, and woodland; in developing rural areas; in engineering work; and in many other ways. Soils are placed in broad classes to facilitate study and comparison in large areas, such as countries and continents.

The classification system currently used was adopted for general use by the National Cooperative Soil Survey in 1965. The current system is under continual study. Therefore, readers interested in developments of the current system should search the latest literature available *(8)*. In table 11, the soil series of Jennings County are placed in classes of the current system *(11)*.

The current system of classification has six categories. Beginning with the broadest, these categories are order, suborder, great group, subgroup, family, and series. In this system the criteria used as a basis for classification are soil properties that are observable and measurable. The properties are chosen, however, so that soils of similar genesis, or mode of origin, are grouped together. Most of the classes of the current system are briefly defined in the following paragraphs.

ORDER.—Ten soil orders are recognized. They are Entisols, Vertisols, Inceptisols, Aridisols, Mollisols, Spodosols, Alfisols, Ultisols, Oxisols, and Histosols. The properties used to differentiate these soil orders are those that tend to give broad climatic groupings of soils. The two exceptions to this are the Entisols and Histosols, which occur in many different kinds of climate. Table 11 shows that the five soil orders in Jennings County are Entisols, Inceptisols, Mollisols, Alfisols, and Ultisols.

Entisols are light-colored soils that do not have natural genetic horizons or that have only weakly expressed beginnings of such horizons. These soils do not have traits that reflect soil mixing caused by shrinking and swelling.

Inceptisols are soils that have one or more of the diagnostic horizons that are believed to form rather quickly. They are most often on young but not recent land surfaces. The name Inceptisol is derived from the Latin *inceptum*, for beginning.

Mollisols formed under grass and have a thick, dark-colored surface horizon containing colloids dominated by bivalent cations. The soil material in these soils has not been mixed by shrinking and swelling.

Alfisols are mineral soils that contain horizons of clay accumulation. Unlike the Mollisols, they lack a thick, dark-colored surface layer that contains colloids dominated by bivalent cations, but the base status of the lower horizons is not extremely low.

Ultisols are mineral soils that have a clay-enriched B horizon that is low in base saturation.

SUBORDER.—Each order has been subdivided into suborders, primarily on the basis of those soil char-

acteristics that seem to produce classes that have the greatest genetic similarity. The suborders narrow the broad climatic range permitted in the orders. Soil properties used to separate suborders are mainly those that reflect either the presence or absence of waterlogging or those that show soil differences resulting from climate or vegetation.

GREAT GROUPS.—Suborders are separated into great groups on the basis of uniformity in the kinds and sequence of major soil horizons and features. The horizons used to make separations are those in which clay, iron, or humus have accumulated; or those that have a fragipan that interferes with the growth of roots or movement of water. Some features used are soil acidity, soil temperature, major differences in chemical composition (mainly calcium, magnesium, sodium, and potassium), and soil color. The great group is not shown separately in table 11 because it is the last word in the name of the subgroup.

SUBGROUP.—Great groups are subdivided into subgroups. One represents the central (typic) segment of the group. Others, called intergrades, have properties of the group and one or more properties of another great group, suborder, or order. Subgroups can also be created in those instances where soil properties intergrade outside of the range of any other group, suborder, or order. The names of subgroups are derived by placing one or more adjectives before the great group.

FAMILY.—Families are separated within a subgroup mainly on the basis of properties important to the growth of plants or on the behavior of soils when used for engineering purposes. Among the properties considered are texture, mineralogy, reaction, soil temperature, permeability, thickness of horizons, and consistence.

Additional Information About the County

The area that is now Jennings County was once occupied by Indians, who probably left the area in the period 1805–17 (*3*). The oldest records in Jennings County indicate that Paris, Graham, Coffee Creek, and Vernon were the first settlements. These settlements were all near streams that supplied water, transportation, and food in the form of fish and game. The soils at these sites were mainly well drained, and they provided good sites for homes, churches, schools, and cemeteries.

This area was first called the "Territory of Indiana." Congress officially recognized the territory by special act as early as 1809, but within 7 years Indiana was officially recognized as a State and Jennings County was named after the first governor. In 1817 the town of Vernon became the county seat because it was in the center of the county and near the river and because it was the largest settlement in the new county.

According to the 1969 census, in the 9-year period 1960-69, the population of this county increased from 17,267 to 19,454. It increased mainly because industry increased in this and adjoining counties. Between 1964 and 1969, the acreage in farms decreased from 168,655 to 156,354; and the number of farms decreased from 1,141 to 976, but the average size of farms increased from nearly 148 acres to 160 acres. During this period the number of full owners of farms decreased from 859 to 733, the number of part owners decreased from 208 to 200, and the number of tenant farmers from 72 to 43.

Farming in the county is based mainly on the growing of grain and the raising of livestock, chiefly hogs and cattle. Among the soils that are better suited to the grain-hog-beef feeding type of farming than most other soils are the Brookston and Fincastle soils in the northwestern part of the county and broad areas of the nearly level Clermont and Avonburg soils in other parts of the county. Among the soils that are better suited to grass and general farming than most other soils are the gently sloping to strongly sloping Cincinnati, Rossmoyne, Jennings, and Grayford soils.

Corn and soybeans are the main crops, but wheat is also grown. Some farmers derive much of their income from a small acreage of tobacco. Grass and legumes provide pasture for livestock, but most pastures consist either of grass mixtures or only of fescue. In recent years pastures of fescue have been highly successful on moderately sloping and strongly sloping soils, such as Cincinnati, Jennings, and Trappist soils.

Water Supply

The sources of water vary widely throughout the county. Most towns get their water from reservoirs or directly from streams.

In many places in the county not enough water can be obtained from dug wells, drilled wells, or springs to supply all the needs for domestic and farm use. The flow of water from springs is not sufficient, and the water in many drilled wells is mineral water that has the objectionable odor of sulphur. Cisterns have been built in some places, but when rainfall is low, other sources are needed.

Most of the water supply is stored in reservoirs, lakes, and ponds. In many places the terrain provides ideal sites for ponds and lakes. In many parts of the county, water for farm use is also supplied by rural waterlines that run from large streams and lakes.

Opportunities exist through watershed programs for building multi-purpose impoundment structures that will provide sources of water for industrial and recreational uses as well as for flood protection.

Climate[4]

Jennings County has an invigorating climate because of the interaction of tropical airmasses with polar airmasses throughout the year. The weather changes every few days because of the passage of weather fronts and the associated centers of low and high pressure. In general, a high brings lower temperatures, lower humidity, and sunny days, and a low brings higher temperatures, increasing southerly winds, higher humidity, and rain or showers. This frontal activity is greatest in spring and least late in summer and early in fall. The

[4] By LAWRENCE A. SCHAAL, climatologist for Indiana, National Weather Service, U.S. Department of Commerce.

TABLE 12.—*Temperature and precipitation data*

[Data from North Vernon, radio station WOCH]

Month	Temperature				Precipitation				
	Average daily maximum	Average daily minimum	Average monthly maximum	Average monthly minimum	Average monthly total	One year in 10 will have: Less than—	One year in 10 will have: More than—	Days with snow cover of 1 inch or more	Average depth of snow on days with snow cover of 1 inch or more
	°F.	*°F.*	*°F.*	*°F.*	*Inches*	*Inches*	*Inches*	*Number*	*Inches*
January	41	22	63	–2	4.1	1.2	7.5	5	2
February	45	24	64	1	3.0	.8	5.6	2	2
March	55	33	75	14	4.8	1.6	7.2	2	4
April	67	43	84	25	4.1	1.2	6.4	0	0
May	77	51	89	34	4.5	1.3	7.6	0	0
June	85	61	94	46	4.6	1.4	7.3	0	0
July	88	64	96	51	3.9	1.2	6.4	0	0
August	87	62	96	48	3.0	1.3	6.2	0	0
September	81	55	94	37	2.6	.5	5.9	0	0
October	71	44	85	26	2.5	.9	5.3	0	0
November	55	34	74	14	3.5	1.4	6.9	1	3
December	43	25	63	4	3.3	1.6	5.7	2	2
Year	66	43	[1] 99	[2] –7	43.9	33.0	55.8	12	3

[1] Average annual highest temperature.
[2] Average annual lowest temperature.

TABLE 13.—*Probabilities of last freezing temperatures in spring and first in fall*

[All data from North Vernon, Jennings County, Indiana]

Probability	Dates for given probability and temperature: 16° F. or lower	20° F. or lower	24° F. or lower	28° F. or lower	32° F. or lower
Spring:					
1 year in 10 later than	March 26	April 4	April 7	April 25	May 12
2 years in 10 later than	March 21	March 29	April 3	April 20	May 6
5 years in 10 later than	March 10	March 19	March 27	April 11	April 26
Fall:					
1 year in 10 earlier than	November 18	October 31	October 20	October 13	October 2
2 years in 10 earlier than	November 22	November 5	October 25	October 17	October 7
5 years in 10 earlier than	December 1	November 15	November 4	October 25	October 16

frequent variations in weather bring pleasant and cloudless days interspersed with rainy days. In summer when large amounts of moisture are used, a month of below-normal rainfall may affect lawns, pastures, and crops.

Table 12 shows temperature and precipitation data, and table 13 shows the probabilities of low temperatures in spring and fall.

Precipitation is rather evenly distributed throughout the year, but there is a tendency for rains in spring and early in summer to exceed those in fall. The spring rains are quite reliable and insure a good supply of moisture going into summer. The losses of moisture through evaporation in summer exceed the gains through rainfall. There has never been a severe drought, but one or two dry periods can be expected each summer. Precipitation of 0.1 inch or more can be expected on an average of 75 days a year. It can be expected on 9 days in May but only on 4 days in September. The probabilities are that, in 1 year out of 25, there will be 2.6 inches of rainfall in 1 hour, 4.0 inches in 6 hours, and 4.4 inches in 12 hours; in 1 year out of 10, there wil be 2.2 inches of rainfall in 1 hour, 3.2 inches in 6 hours, and 3.7 in 12 hours; and in 1 year out of 5, there will be 1.9 inches of rainfall in 1 hour, 2.9 inches in 6 hours, and 3.4 inches in 12 hours.

Snowfall varies greatly from winter to winter. It averages about 16 inches a season, but there has been as much as 21 inches in 1 month and as much as 9 inches in 1 day.

The air temperature exceeds 90°F on an average of about 39 days a year. An average of 12 of these days can be expected in August and 12 in September.

On sunny days in summer, the relative humidity ranges from a percentage in the 40's early in the afternoon to a percentage in the 90's about sunrise. During a typical day, it rises and falls much as temperature does, but the highest percentage usually occurs with

the minimum temperature and the lowest percentage with the maximum temperature. The dry air behind a cold front is important in decreasing humidity, and moist warm air out of the south increases the humidity.

The wind blows most frequently from the southwest, but in one or two winter months, the prevailing winds are northwesterly. Damaging winds have three sources. In order of diminishing coverage but increasing intensity they are: passing centers of low pressure through the region, thunderstorms, and tornadoes. Only four tornadoes have been reported in the county since 1916. Lightning and thunder occur on an average of about 44 days a year. Few of these storms are of sufficient intensity to cause injury to people or damage to property.

The percentage of maximum possible sunshine ranges from 40 in January to 70 in August. In October sunny days are more frequent than in other months, 12 days are clear, and only 11 days are cloudy. In winter, 6 days a month are usually clear, but 19 days are cloudy.

Literature Cited

(1) American Association of State Highway Officials. 1961. Standard specifications for highway materials and methods of sampling and testing. Ed. 8, 2 vol., illus.

(2) Conservation Needs Committee. 1968. Indiana soil and water conservation needs inventory, 224 pp., illus.

(3) Deputy, Malcolm. 1963. The land of winding waters. Our Heritage, Inc. 25 pp., illus.

(4) Indiana Department of Conservation. 1952. Geol. Surv. Circ. 1. 17 pp., illus.

(5) Murdock, Stanley H. 1969. A story of Indiana geology. 13 pp., illus.

(6) Putnam, John A., Furnival, George M., and McKnight, J. S. 1960. Management and inventory of southern hardwoods. U.S. Dep. Agric. Handb. 181, 102 pp., illus.

(7) Schnur, G. Luther. 1937. Yields, stand, and volume tables for even-aged upland oak forests. U.S. Dep. Agric. Tech. Bul. 560, 88 pp., illus.

(8) Simonson, Roy W. 1962. Soil classification in the United States. Science 137, pp. 1027-1034, illus.

(9) Society of American Foresters. 1955. Forestry handbook. Ronald Press, New York, 1141 pp., illus.

(10) United States Department of Agriculture. 1951. Soil survey manual. U.S. Dept. Agric. Handb. 18, 503 pp., illus. [Supplement issued May 1962]

(11) ———— 1960. Soil classification, a comprehensive system, 7th approximation. Soil Surv. Staff, Soil Conserv. Serv. 265 pp., illus. [Supplements issued in March 1967 and September 1968]

(12) ———— 1961. Land capability classification. U.S. Dep. Agric. Handb. 210, 21 pp.

(13) United States Department of Defense. 1962. Unified soil classification system for roads, airfields, embankments, and foundations. MIL-STD-619 B, 13 pp., illus.

Glossary

Alluvium. Soil material, such as sand, silt, or clay, that has been deposited on land by streams.

Available water capacity (also termed available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil.

Calcareous soil. A soil containing enough calcium carbonate (often with magnesium carbonate) to effervesce (fizz) visibly when treated with cold, dilute hydrochloric acid.

Catena. A sequence, or "chain," of soils on a landscape, developed from one kind of parent material but having different characteristics because of differences in relief and drainage.

Clay film. A thin coating of clay on the surface of a soil aggregate. Synonyms: clay coat, clay skin.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrations of compounds, or of soil grains cemented together. The composition of some concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are examples of material commonly found in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material, and tends to stretch somewhat and pull apart, rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard and brittle; little affected by moistening.

Contour. An imaginary line connecting points of equal elevation on the surface of the soil.

Contour farming. Plowing, cultivating, planting, and harvesting in rows that are right angles to the natural direction of the slope or that are parallel to terrace grade.

Cover crop. A close-growing crop grown primarily to improve and to protect the soil between periods of regular crop production; or a crop grown between trees and vines in orchards and vineyards.

Diversion, or diversion terrace. A ridge of earth, generally a terrace, that is built to divert runoff from its natural course and, thus, to protect areas downslope from the effects of such runoff.

Drainage class (natural). Refers to the conditions of frequency and duration of periods of saturation or partial saturation that existed during the development of the soil, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven different classes of natural soil drainage are recognized.

Excessively drained soils are commonly very porous and rapidly permeable and have a low water-holding capacity.

Somewhat excessively drained soils are also very permeable and are free from mottling throughout their profile.

Well-drained soils are nearly free from mottling and are commonly of intermediate texture.

Moderately well drained soils commonly have a slowly permeable layer in or immediately beneath the solum. They have uniform color in the A and upper B horizons and have mottling in the lower B and the C horizons.

Somewhat poorly drained soils are wet for significant periods but not all the time, and some soils commonly have mottling at a depth below 6 to 16 inches.

Poorly drained soils are wet for long periods and are light gray and generally mottled from the surface downward, although mottling may be absent or nearly so in some soils.

Very poorly drained soils are wet nearly all the time. They have a dark-gray or black surface layer and are gray or light gray, with or without mottling, in the deeper parts of the profile.

Eluviation. The movement of material from one place to another within the soil, in either true solution or colloidal suspension. Soil horizons that have lost material through eluviation are said to be eluvial; those that have received material are illuvial.

Fertility, soil. The quality of a soil that enables it to provide compounds, in adequate amounts and in proper balance, for the growth of specified plants, when other growth factors such as light, moisture, temperature, and the physical condition of the soil are favorable.

Fragipan. A loamy, brittle, subsurface horizon that is very low in organic-matter content and clay but is rich in silt or very fine sand. The layer is seemingly cemented. When dry, it is hard or very hard and has a high bulk density in comparison with the horizon or horizons above it. When moist, the fragipan tends to rupture suddenly if pressure is applied, rather than to deform slowly. The layer is generally mottled, is slowly or very slowly permeable to water, and has few or many bleached fracture planes that form polygons. Fragipans are a few inches to several feet thick; they generally occur below the B horizon, 15 to 40 inches below the surface.

Gleization. The reduction, translocation, and segregation of soil compounds, notably of iron, usually in the lower horizons, as a result of water-logging with poor aeration and drainage; expressed in the soil by mottled colors dominated by gray. The soil-forming processes leading to the development of a gley soil.

Green manure (agronomy). A crop grown for the purpose of being turned under in an early stage of maturity or soon after maturity for soil improvement.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes. These are the major horizons:

O horizon.—The layer of organic matter on the surface of a mineral soil. This layer consists of decaying plant residues.

A horizon.—The mineral horizon at the surface or just below an O horizon. This horizon is the one in which living organisms are most active and therefore is marked by the accumulation of humus. The horizon may have lost one or more of soluble salts, clay, and sesquioxides (iron and aluminum oxides).

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or some combination of these; (2) by prismatic or blocky structure; (3) by redder or stronger colors than the A horizon; or (4) by some combination of these. Combined A and B horizons are usually called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The weathered rock material immediately beneath the solum. In most soils this material is presumed to be like that from which the overlying horizons were formed. If the material is known to be different from that in the solum, a Roman numeral precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock usually underlies a C horizon but may be immediately beneath an A or B horizon.

Illuviation. The accumulation of material in a soil horizon through the deposition of suspended material and organic matter removed from horizons above. Since part of the fine clay in the B horizon (or subsoil) of many soils has moved into the B horizon from the A horizon above, the B horizon is called an illuvial horizon.

Internal soil drainage. The downward movement of water through the soil profile. The rate of movement is determined by the texture, structure, and other characteristics of the soil profile and underlying layers, and by height of the water table, either permanent or perched. Relative terms for expressing internal drainage are *none, very slow, slow, medium, rapid,* and *very rapid.*

Leaching. The removal of soluble materials from soil or other material by percolating water.

Loess. Fine-grained material, dominantly of silt-sized particles, that has been deposited by wind.

Mineral soil. Soil composed mainly of inorganic (mineral) material and low in content of organic material. Its bulk density is greater than that of organic soil.

Mottling, soil. Irregularly marked with spots of different colors that vary in number and size. Mottling in soils usually indicates poor aeration and lack of drainage. Descriptive terms are as follows: Abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent.* The size measurements are these: *fine,* less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; *medium,* ranging from 5 millimeters to 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimension; and *coarse,* more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimension.

Parent material. Disintegrated and partly weathered rock from which soil has formed.

Permeability. The quality that enables the soil to transmit water or air. Terms used to describe permeability are as follows: *very slow, slow, moderately slow, moderate, moderately rapid, rapid,* and *very rapid.*

Plow layer. The soil ordinarily moved in tillage; equivalent to surface soil.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is precisely neutral in reaction, because it is neither acid nor alkaline. An acid, or "sour," soil is one that gives an acid reaction; an alkaline soil is one that is alkaline in reaction. In words, the degrees of acidity or alkalinity are expressed thus:

	pH		*pH*
Extremely acid	Below 4.5	Mildly alkaline	7.4 to 7.8
Very strongly acid	4.5 to 5.0	Moderately alkaline	7.9 to 8.4
Strongly acid	5.1 to 5.5	Strongly alkaline	8.5 to 9.0
Medium acid	5.6 to 6.0	Very strongly alkaline	9.1 and higher
Slightly acid	6.1 to 6.5		
Neutral	6.6 to 7.3		

Relief. The elevations or inequalities of a land surface, considered collectively.

Rill. A steep-sided channel resulting from accelerated erosion. A rill normally is a few inches in depth and width and is not large enough to be an obstacle to farm machinery.

Segregations. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrations of compounds, or of soil grains that are soft or can be pressed together with pressure by thumb and finger.

Silting. Settling of waterborne sediments, chiefly silt, in lakes, reservoirs, stream channels, or overflow areas.

Slope. The difference in elevation, in feet, between two points 100 feet apart horizontally. As used in this survey, slopes, in percent, are designated as follows:

Nearly level	0 to 2 percent
Gently sloping	2 to 6 percent
Moderately sloping	6 to 12 percent
Strongly sloping	12 to 18 percent
Moderately steep	18 to 25 percent
Steep	25 to 35 percent
Very steep	35 percent or more

Soil. A natural, three-dimensional body on the earth's surface that supports plants and that has properties resulting from the integrated effect to climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Solum. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in mature soil includes the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristic of the soil are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering together without any regular cleavage, as in many claypans and hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. Technically, the part of the soil below the solum.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches in thickness. The plowed layer.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that it may soak into the soil or flow slowly to a prepared outlet without harm. Terraces in fields are generally built so they can be farmed. Terraces intended mainly for drainage have a deep channel that is maintained in permanent sod.

Terrace (geological). An old alluvial plain, ordinarily, flat or undulating, bordering a river, lake, or the sea. Stream terraces are frequently called second bottoms, as contrasted to flood plains, and are seldom subject to overflow. Marine terraces were deposited by the sea and are generally wide.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," fine," or "very fine."

Water table. The highest part of the soil or underlying rock material that is wholly saturated with water. In some places an upper, or perched, water table may be separated from a lower one by a dry zone.

GUIDE TO MAPPING UNITS

For a full description of a mapping unit, read the description of the mapping unit and that of the soil series to which the mapping unit belongs. Information on the tree and shrub groups is given in table 4 on page 48, and information on woodland suitability groups is given in table 3 on page 46. Other information is given in tables as follows:

Acreage and extent, table 1, page 9.
Estimated average yields, table 2, page 43.
Engineering uses of the soils, tables 7, 8, and 9, pages 58 to 73.
Town and country planning, table 10, page 74.

Map symbol	Mapping unit	Page	Capability unit		Tree and shrub group	Woodland suitability group
			Symbol	Page	Number	Number
AvA	Avonburg silt loam, 0 to 2 percent slopes	10	IIw-3	40	2	5
AvB2	Avonburg silt loam, 2 to 4 percent slopes, eroded	10	IIe-13	39	2	5
Ba	Bartle silt loam	11	IIw-3	40	2	5
Bo	Bonnie silt loam	12	IIIw-10	41	1	11
Br	Brookston silty clay loam	12	IIw-1	39	1	11
CnB2	Cincinnati silt loam, 2 to 6 percent slopes, eroded	13	IIe-7	39	2	9
CnC2	Cincinnati silt loam, 6 to 12 percent slopes, eroded	13	IIIe-7	41	2	9
CnC3	Cincinnati silt loam, 6 to 12 percent slopes, severely eroded	14	IVe-7	42	2	9
CnD2	Cincinnati silt loam, 12 to 18 percent slopes, eroded	14	IVe-7	42	2	9
CnD3	Cincinnati silt loam, 12 to 18 percent slopes, severely eroded	14	VIe-1	42	2	9
CoC2	Cincinnati-Rossmoyne silt loams, 4 to 10 percent slopes, eroded	15	IIIe-7	41	2	9
Cr	Clermont silt loam	16	IIIw-12	41	1	11
CyF	Corydon stony silt loam, 25 to 40 percent slopes	17	VIIe-2	42	4	7
Ee	Eel silt loam	17	I-2	38	3	8
ElA	Elkinsville silt loam, 0 to 2 percent slopes	18	I-1	38	3	1
ElB2	Elkinsville silt loam, 2 to 6 percent slopes, eroded	18	IIe-3	39	3	1
ElC2	Elkinsville silt loam, 6 to 12 percent slopes, eroded	18	IIIe-3	41	3	1
FcA	Fincastle silt loam, 0 to 3 percent slopes	19	IIw-2	40	2	5
FrB2	Fincastle-Russell silt loams, 2 to 6 percent slopes, eroded	19	IIe-12	39	--	5
	Fincastle part	--	-----	--	2	--
	Russell part	--	-----	--	3	--
Ge	Genesee loam	20	I-2	38	3	8
GfB2	Grayford silt loam, 2 to 6 percent slopes, eroded	21	IIe-3	39	3	1
GfC2	Grayford silt loam, 6 to 12 percent slopes, eroded	21	IIIe-3	41	3	1
GfC3	Grayford silt loam, 6 to 12 percent slopes, severely eroded	21	IVe-3	42	3	1
GfD2	Grayford silt loam, 12 to 18 percent slopes, eroded	21	IVe-3	42	3	1
GfD3	Grayford silt loam, 12 to 18 percent slopes, severely eroded	22	VIe-1	42	3	1
GoE2	Grayford-Corydon soils, 18 to 25 percent slopes, eroded	22	VIe-1	42	--	1
	Grayford part	--	-----	--	3	--
	Corydon part	--	-----	--	4	--
Gu	Gullied land	22	VIIe-1	42	4	14
Ha	Haymond silt loam	23	I-2	38	3	8
HkE2	Hickory loam, 18 to 25 percent slopes, eroded	24	VIe-1	42	3	2
HkF	Hickory loam, 25 to 50 percent slopes	24	VIIe-1	42	3	2
JnB2	Jennings silt loam, 2 to 6 percent slopes, eroded	25	IIe-7	39	2	9
JnC2	Jennings silt loam, 6 to 12 percent slopes, eroded	25	IIIe-7	41	2	9
JnC3	Jennings silt loam, 6 to 12 percent slopes, severely eroded	26	IVe-7	42	2	9

Map symbol	Mapping unit	Page	Capability unit		Tree and shrub group	Woodland suitability group
			Symbol	Page	Number	Number
JnD2	Jennings silt loam, 12 to 18 percent slopes, eroded	26	IVe-7	42	2	9
JnD3	Jennings silt loam, 12 to 18 percent slopes, severely eroded	26	VIe-1	42	2	9
MmC2	Miami silt loam, 6 to 12 percent slopes, eroded	27	IIIe-1	40	3	1
MmD2	Miami silt loam, 12 to 18 percent slopes, eroded	27	IVe-1	41	3	1
MoC3	Miami clay loam, 6 to 12 percent slopes, severely eroded	27	IVe-1	41	3	1
PaB2	Parke silt loam, 2 to 6 percent slopes, eroded	28	IIe-1	38	3	1
PaC2	Parke silt loam, 6 to 12 percent slopes, eroded	28	IIIe-1	40	3	1
PaC3	Parke silt loam, 6 to 12 percent slopes, severely eroded	28	IVe-1	41	3	1
PcA	Pekin silt loam, 0 to 2 percent slopes	29	IIw-5	40	2	9
PcB2	Pekin silt loam, 2 to 6 percent slopes, eroded	29	IIe-7	39	2	9
PcC2	Pekin silt loam, 6 to 10 percent slopes, eroded	29	IIIe-7	41	2	9
Pe	Peoga silt loam	30	IIIw-12	41	1	11
RsA	Rossmoyne silt loam, 0 to 2 percent slopes	31	IIw-5	40	2	9
RsB2	Rossmoyne silt loam, 2 to 6 percent slopes, eroded	31	IIe-7	39	2	9
RsB3	Rossmoyne silt loam, 2 to 6 percent slopes, severely eroded	31	IIIe-7	41	2	9
St	Steff silt loam	33	I-2	38	3	8
Sx	Stendal silt loam	33	IIw-7	40	1	13
TrC2	Trappist silt loam, 6 to 12 percent slopes, eroded	35	IVe-8	42	4	10
TrD2	Trappist silt loam, 12 to 18 percent slopes, eroded	35	VIe-1	42	4	10
TsC3	Trappist silty clay loam, 6 to 12 percent slopes, severely eroded	35	VIe-1	42	4	10
TsD3	Trappist silty clay loam, 12 to 18 percent slopes, severely eroded	35	VIIe-1	42	4	10
Wa	Wakeland silt loam	36	IIw-7	40	1	13
WkE2	Weikert shaly silt loam, 18 to 40 percent slopes, eroded	36	VIIe-2	42	4	22
Wu	Wilbur silt loam	37	I-2	38	3	8

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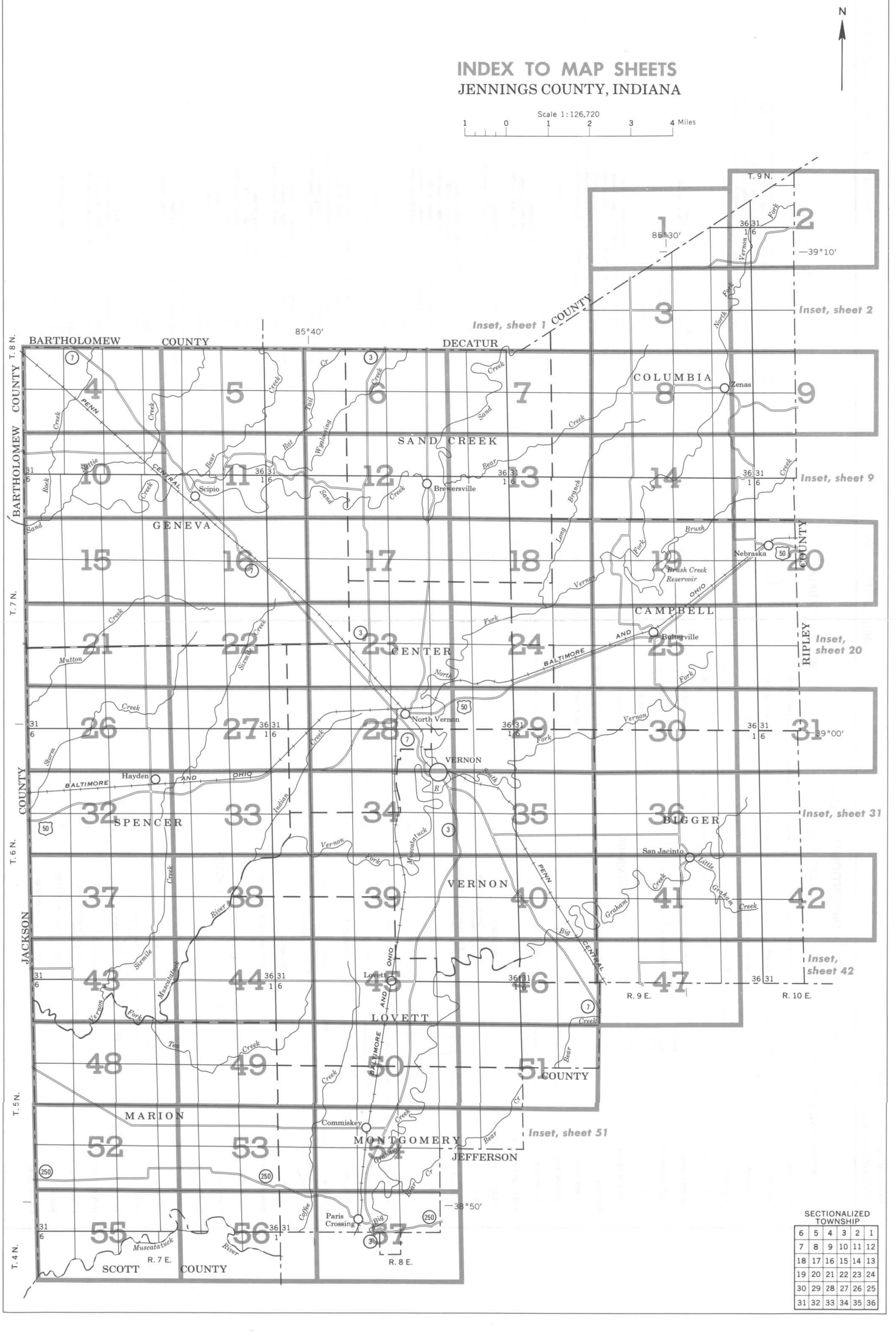
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
PURDUE UNIVERSITY AGRICULTURAL EXPERIMENT STATION
GENERAL SOIL MAP
JENNINGS COUNTY, INDIANA
Scale 1:126,720
1 0 1 2 3 4 Miles
N
SOIL ASSOCIATIONS
1 Haymond-Wakeland-Wilbur association: Deep, well drained to somewhat poorly drained, nearly level soils formed in recent loamy alluvium; on bottom lands
2 Cincinnati-Rossmoyne-Grayford association: Deep, well drained and moderately well drained, nearly level to moderately steep soils formed dominantly in loess and underlying loamy glacial till; on uplands
3 Clermont-Avonburg association: Deep, poorly drained and somewhat poorly drained, nearly level and gently sloping soils formed in loess and underlying loamy glacial till; on uplands
4 Fincastle-Russell-Miami association: Deep, somewhat poorly drained and well drained, nearly level to strongly sloping soils formed in thin loess and underlying loamy glacial till; on uplands
5 Miami-Fincastle-Russell association: Deep, well drained and somewhat poorly drained, gently sloping to strongly sloping soils formed in thin loess and underlying loamy glacial till; on uplands
6 Genesee-Eel association: Deep, well drained and moderately well drained, nearly level soils formed in recent loamy alluvium; on bottom lands
Compiled 1974
BARTHOLOMEW COUNTY
DECATUR COUNTY
RIPLEY COUNTY
JACKSON COUNTY
JEFFERSON COUNTY
SCOTT COUNTY
GENEVA
SAND CREEK
COLUMBIA
CAMPBELL
CENTER
SPENCER
BIGGER
VERNON
LOVETT
MARION
MONTGOMERY
Scipio
Brewersville
Zenas
Nebraska
Butlerville
North Vernon
VERNON
Hayden
San Jacinto
Lovett
Commiskey
Paris Crossing
Brush Creek Reservoir
BALTIMORE AND OHIO
PENN CENTRAL
T. 9 N.
T. 8 N.
T. 7 N.
T. 6 N.
T. 5 N.
T. 4 N.
R. 7 E.
R. 8 E.
R. 9 E.
R. 10 E.
85°30′
85°40′
39°10′
39°00′
38°50′
SECTIONALIZED TOWNSHIP
Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

INDEX TO MAP SHEETS
JENNINGS COUNTY, INDIANA



6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

CONVENTIONAL SIGNS

WORKS AND STRUCTURES

Highways and roads
- Divided
- Good motor
- Poor motor
- Trail

Highway markers
- National Interstate
- U. S.
- State or county

Railroads
- Single track
- Multiple track
- Abandoned

Bridges and crossings
- Road
- Trail
- Railroad
- Ferry (FY)
- Ford (FORD)
- Grade
- R. R. over
- R. R. under

Buildings
- School
- Church

Mine and quarry

Gravel pit

Power line

Pipeline

Cemetery

Dams

Levee

Tanks

Well, oil or gas

Forest fire or lookout station

Windmill

Located object

BOUNDARIES

- National or state
- County
- Minor civil division
- Reservation
- Land grant
- Small park, cemetery, airport
- Land survey division corners

DRAINAGE

Streams, double-line
- Perennial
- Intermittent

Streams, single-line
- Perennial
- Intermittent
  - Crossable with tillage implements
  - Not crossable with tillage implements
  - Unclassified

Canals and ditches

Lakes and ponds
- Perennial (water, w)
- Intermittent (int)

Spring

Marsh or swamp

Wet spot

Drainage end or alluvial fan

RELIEF

Escarpments
- Bedrock
- Other

Short steep slope

Prominent peak

Depressions (Large, Small)
- Crossable with tillage implements
- Not crossable with tillage implements
- Contains water most of the time

SOIL SURVEY DATA

- Soil boundary and symbol (Dx)
- Gravel
- Stoniness: Stony; Very stony
- Rock outcrops
- Chert fragments
- Clay spot
- Sand spot
- Gumbo or scabby spot
- Made land
- Severely eroded spot
- Blowout, wind erosion
- Gully
- River wash (R.W.)

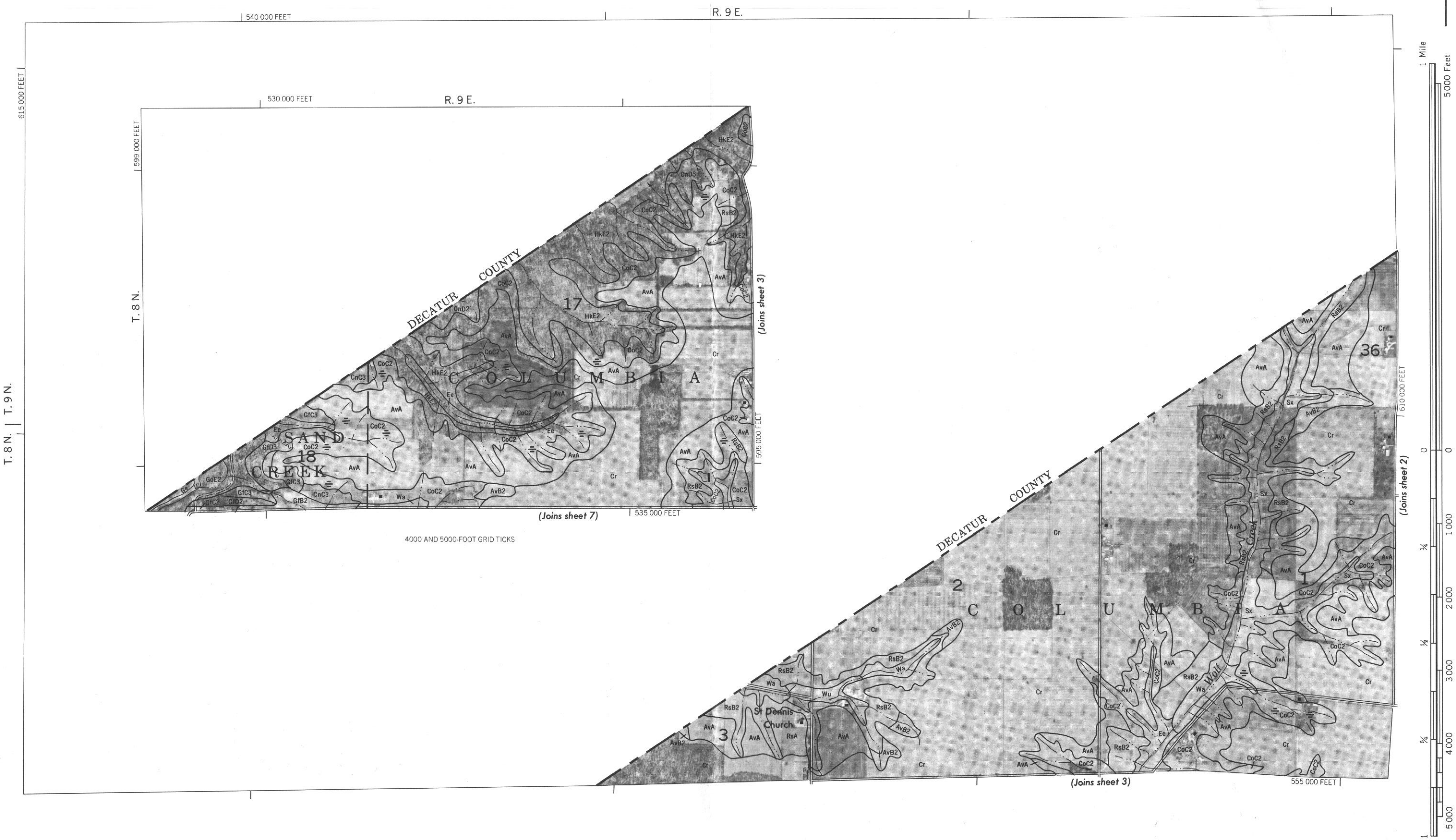
SOIL LEGEND

The first capital letter is the initial one of the soil name. The lowercase letter that follows separates mapping units having names that begin with the same letter except that it does not separate sloping or eroded phases. The second capital letter indicates the class of slope. Symbols without a slope letter are for soils with a slope range of 0 to 2 percent or they are for gullied land with a wide range of slope. A final number, 2 or 3, in the symbol indicates that the soil is eroded or severely eroded, respectively.

SYMBOL	NAME
AvA	Avonburg silt loam, 0 to 2 percent slopes
AvB2	Avonburg silt loam, 2 to 4 percent slopes, eroded
Ba	Bartle silt loam
Bo	Bonnie silt loam
Br	Brookston silty clay loam
CnB2	Cincinnati silt loam, 2 to 6 percent slopes, eroded
CnC2	Cincinnati silt loam, 6 to 12 percent slopes, eroded
CnC3	Cincinnati silt loam, 6 to 12 percent slopes, severely eroded
CnD2	Cincinnati silt loam, 12 to 18 percent slopes, eroded
CnD3	Cincinnati silt loam, 12 to 18 percent slopes, severely eroded
CoC2	Cincinnati-Rossmoyne silt loams, 4 to 10 percent slopes, eroded
Cr	Clermont silt loam
CyF	Corydon stony silt loam, 25 to 40 percent slopes
Ee	Eel silt loam
ElA	Elkinsville silt loam, 0 to 2 percent slopes
ElB2	Elkinsville silt loam, 2 to 6 percent slopes, eroded
ElC2	Elkinsville silt loam, 6 to 12 percent slopes, eroded
FcA	Fincastle silt loam, 0 to 3 percent slopes
FrB2	Fincastle-Russell silt loams, 2 to 6 percent slopes, eroded
Ge	Genesee loam
GfB2	Grayford silt loam, 2 to 6 percent slopes, eroded
GfC2	Grayford silt loam, 6 to 12 percent slopes, eroded
GfC3	Grayford silt loam, 6 to 12 percent slopes, severely eroded
GfD2	Grayford silt loam, 12 to 18 percent slopes, eroded
GfD3	Grayford silt loam, 12 to 18 percent slopes, severely eroded
GoE2	Grayford-Corydon soils, 18 to 25 percent slopes, eroded
Gu	Gullied land
Ha	Haymond silt loam
HkE2	Hickory loam, 18 to 25 percent slopes, eroded
HkF	Hickory loam, 25 to 50 percent slopes
JnB2	Jennings silt loam, 2 to 6 percent slopes, eroded
JnC2	Jennings silt loam, 6 to 12 percent slopes, eroded
JnC3	Jennings silt loam, 6 to 12 percent slopes, severely eroded
JnD2	Jennings silt loam, 12 to 18 percent slopes, eroded
JnD3	Jennings silt loam, 12 to 18 percent slopes, severely eroded
MmC2	Miami silt loam, 6 to 12 percent slopes, eroded
MmD2	Miami silt loam, 12 to 18 percent slopes, eroded
MoC3	Miami clay loam, 6 to 12 percent slopes, severely eroded
PaB2	Parke silt loam, 2 to 6 percent slopes, eroded
PaC2	Parke silt loam, 6 to 12 percent slopes, eroded
PaC3	Parke silt loam, 6 to 12 percent slopes, severely eroded
PcA	Pekin silt loam, 0 to 2 percent slopes
PcB2	Pekin silt loam, 2 to 6 percent slopes, eroded
PcC2	Pekin silt loam, 6 to 10 percent slopes, eroded
Pe	Peoga silt loam
RsA	Rossmoyne silt loam, 0 to 2 percent slopes
RsB2	Rossmoyne silt loam, 2 to 6 percent slopes, eroded
RsB3	Rossmoyne silt loam, 2 to 6 percent slopes, severely eroded
St	Steff silt loam
Sx	Stendal silt loam
TrC2	Trappist silt loam, 6 to 12 percent slopes, eroded
TrD2	Trappist silt loam, 12 to 18 percent slopes, eroded
TsC3	Trappist silty clay loam, 6 to 12 percent slopes, severely eroded
TsD3	Trappist silty clay loam, 12 to 18 percent slopes, severely eroded
Wa	Wakeland silt loam
WkE2	Weikert shaly silt loam, 18 to 40 percent slopes, eroded
Wu	Wilbur silt loam

JENNINGS COUNTY, INDIANA NO. 1

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Purdue University Agricultural Experiment Station.
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone.
Land division corners are approximately positioned on this map.



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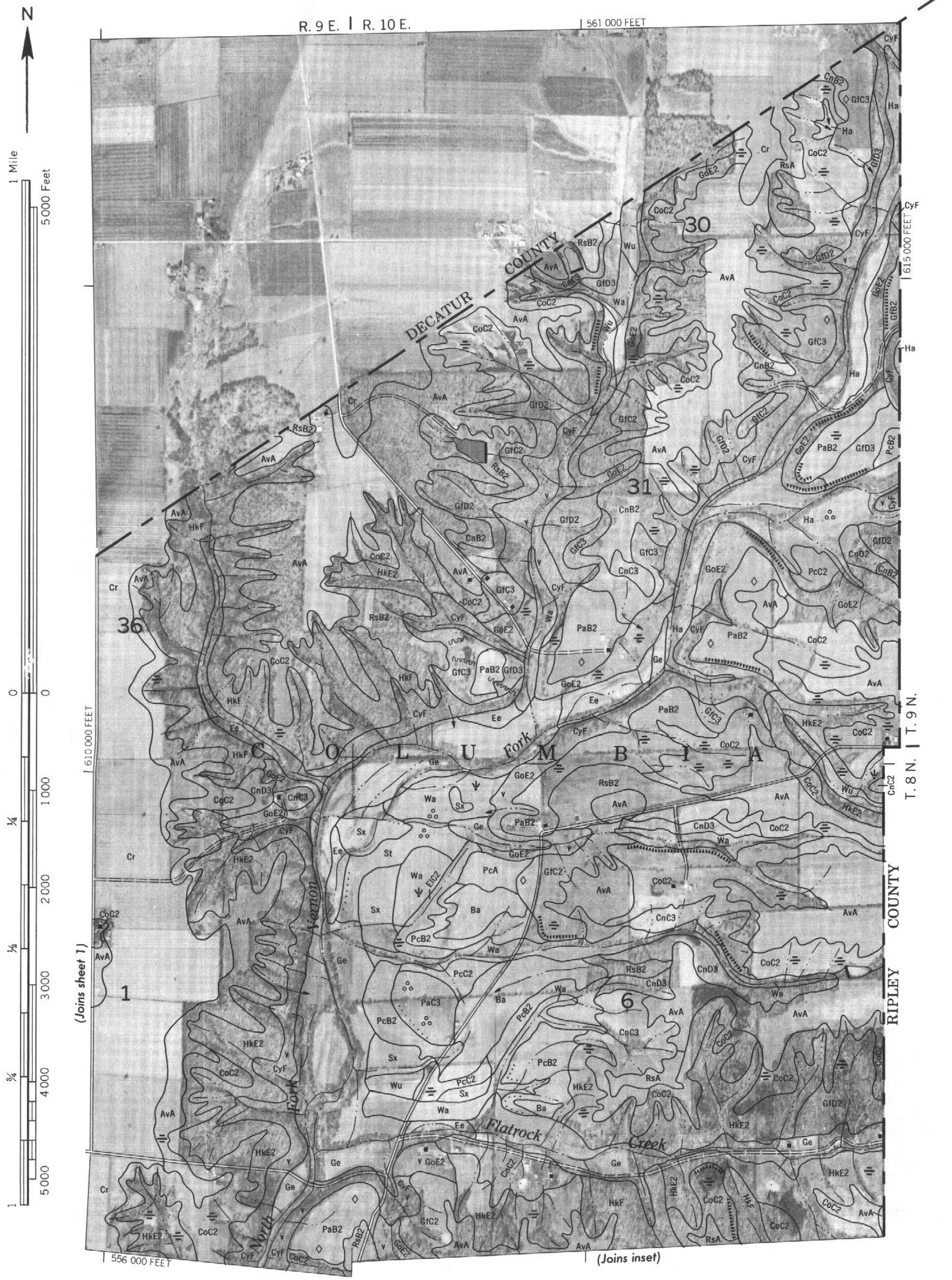

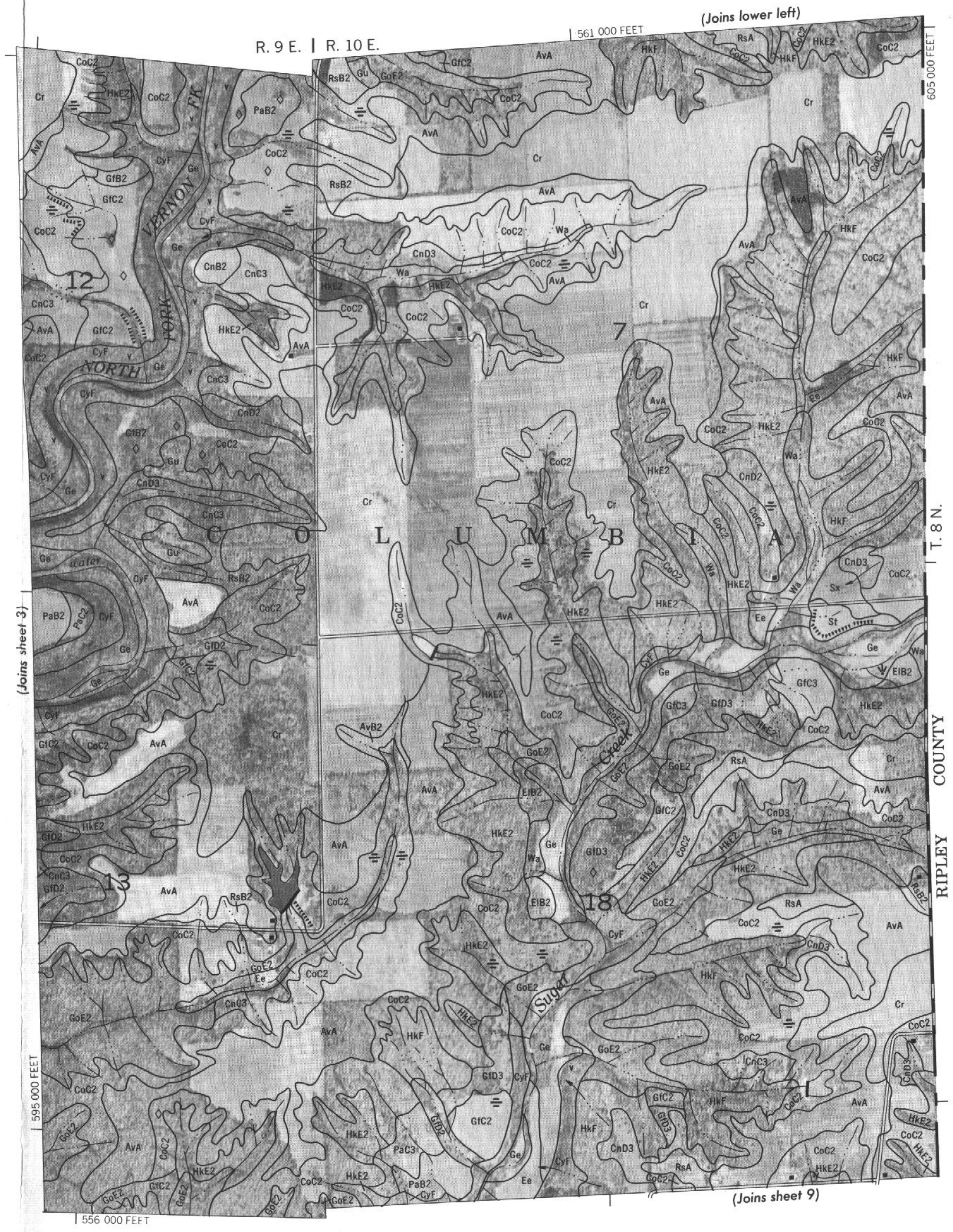

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3

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Land division corners are approximately positioned on this map.

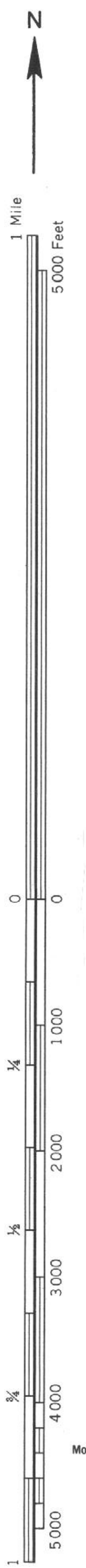
1 Mile

5000 Feet

0 ¼ ½ ¾ 1

0 1000 2000 3000 4000 5000

4



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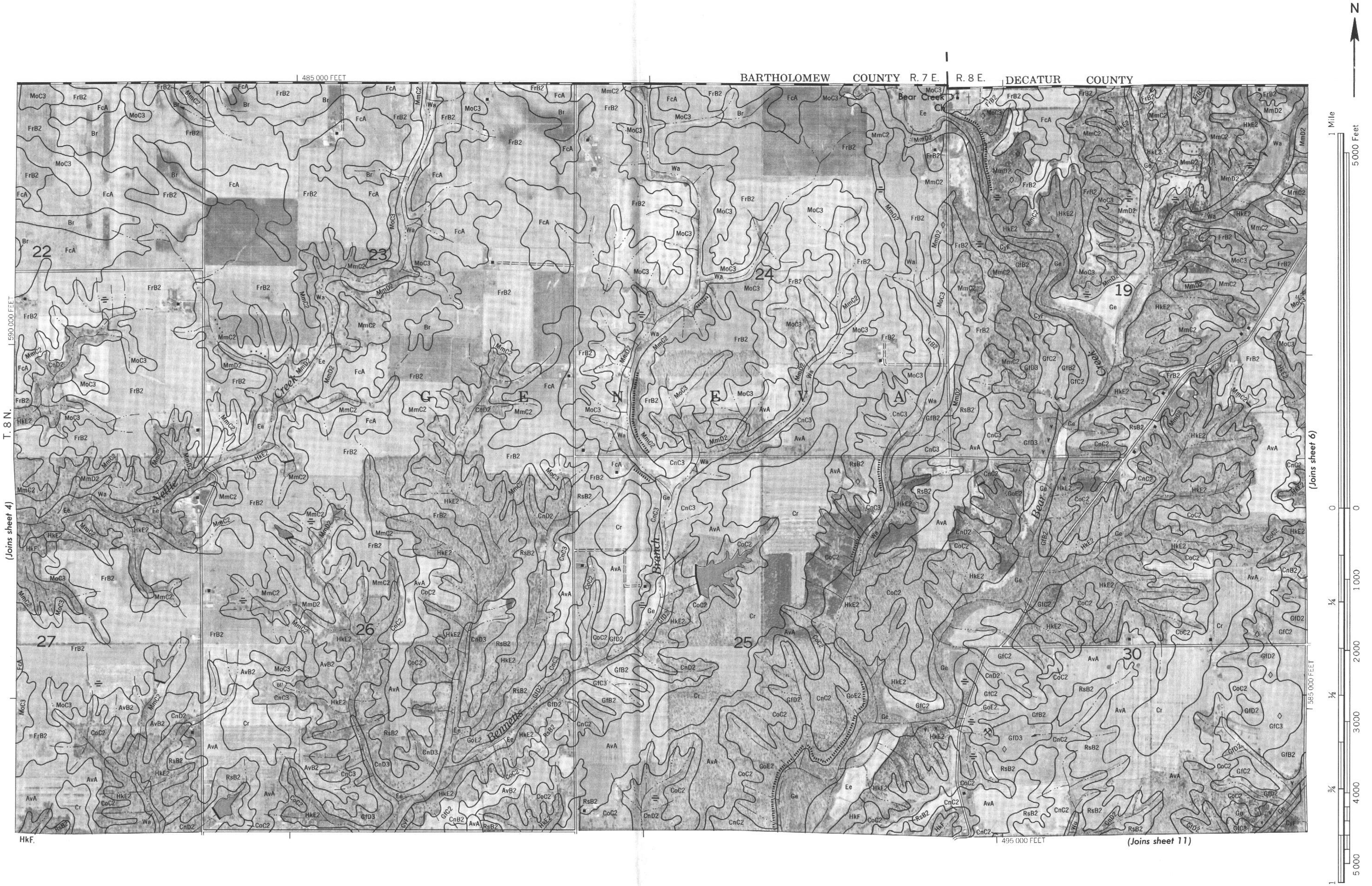

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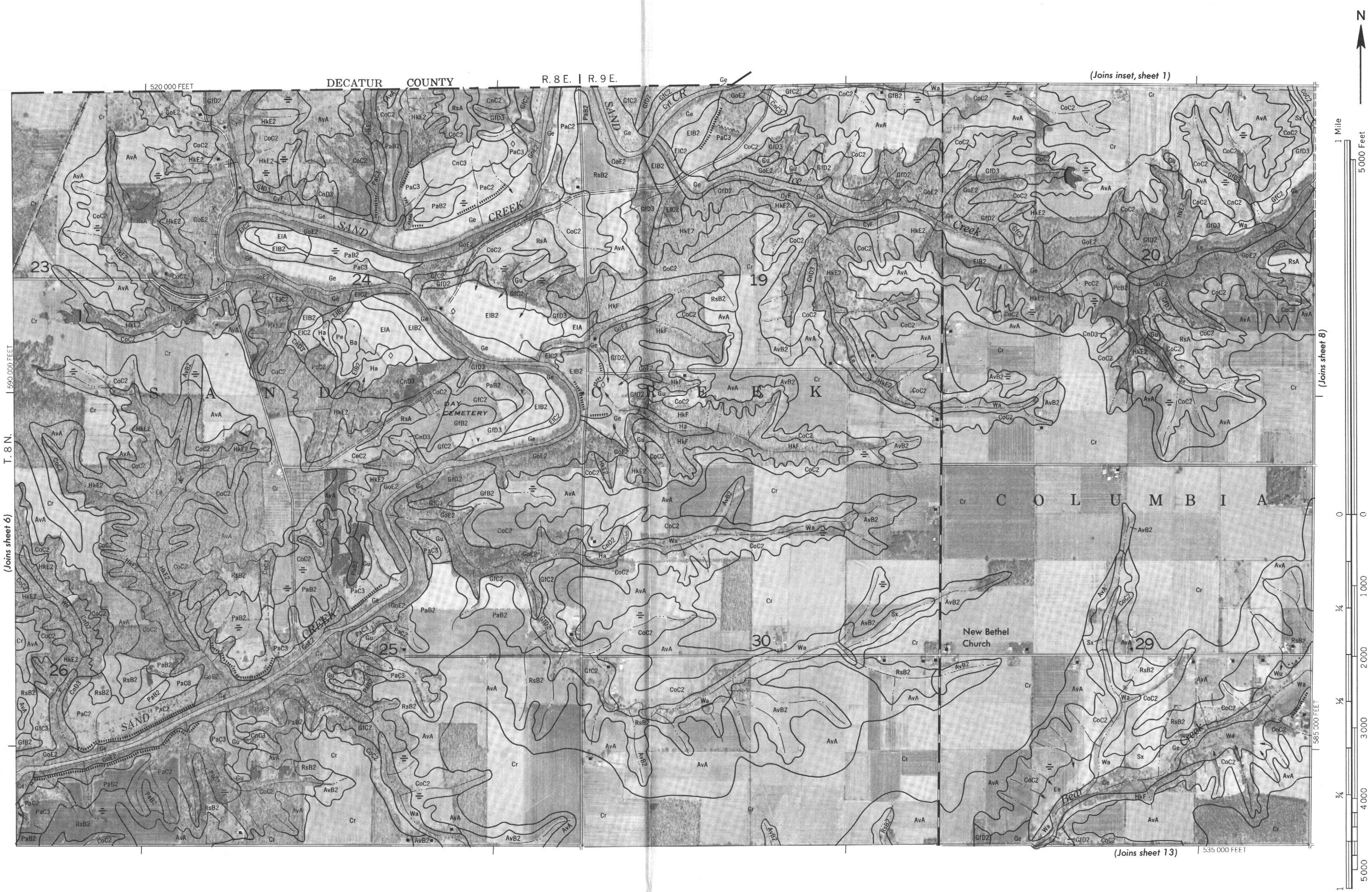

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Land division corners are approximately positioned on this map.

JENNINGS COUNTY, INDIANA — SHEET NUMBER 8

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JENNINGS COUNTY, INDIANA NO. 9

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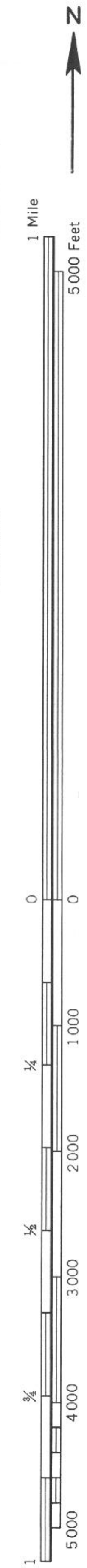
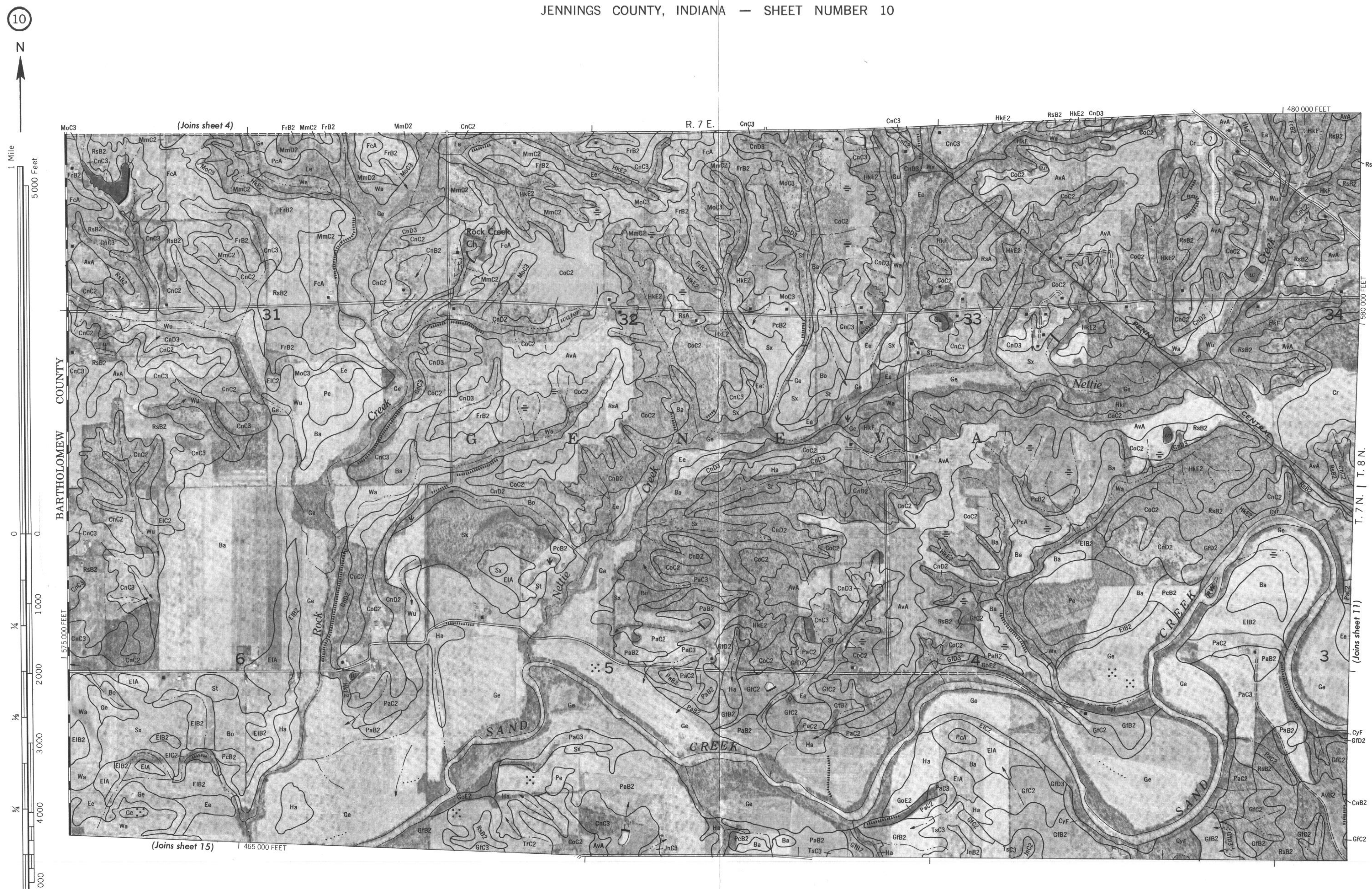
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone.
Land division corners are approximately positioned on this map.





Land division corners are approximately positioned on this map.
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone.
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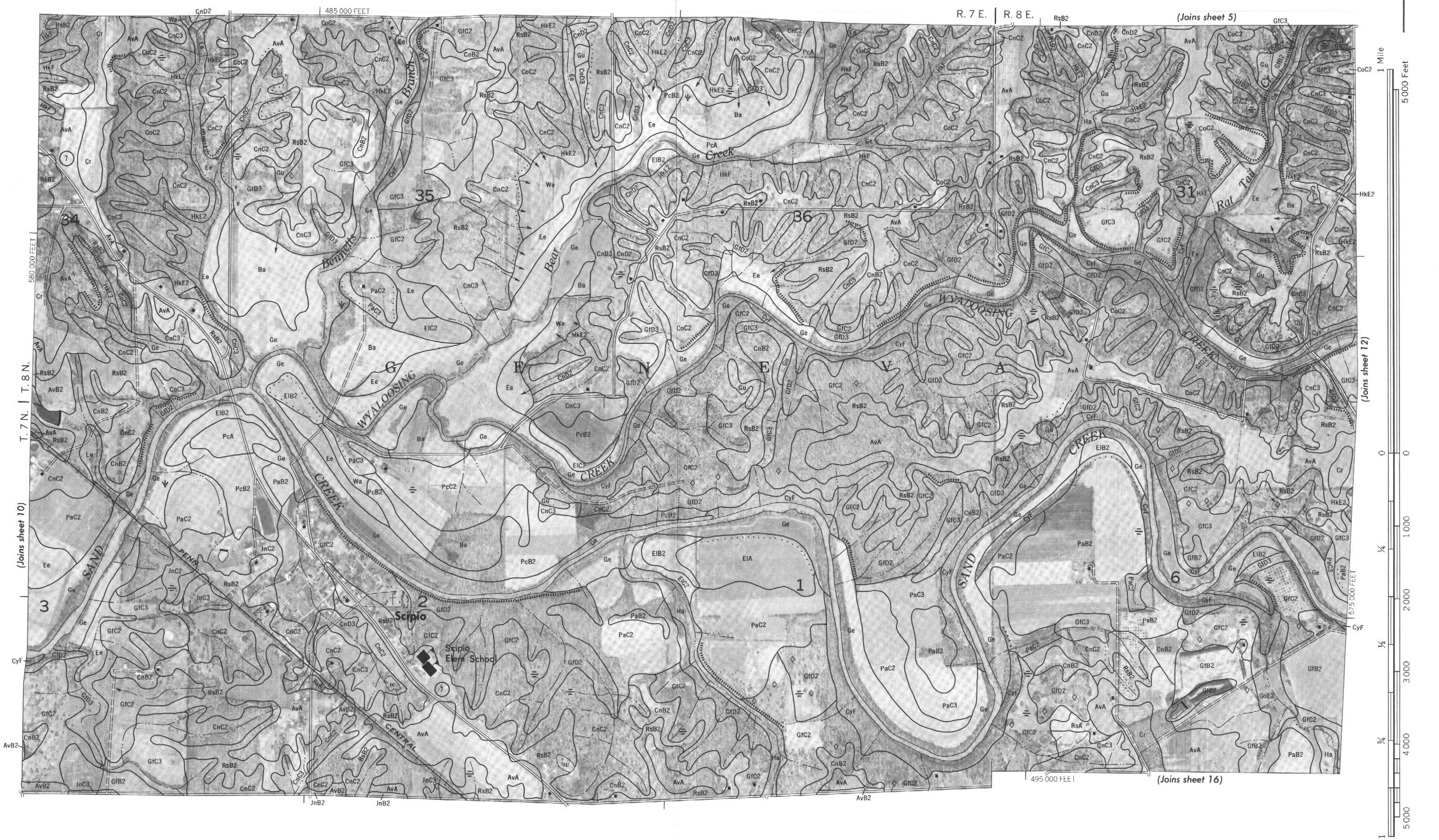

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Land division corners are approximately positioned on this map.

JENNINGS COUNTY, INDIANA — SHEET NUMBER 12

Land division corners are approximately positioned on this map.
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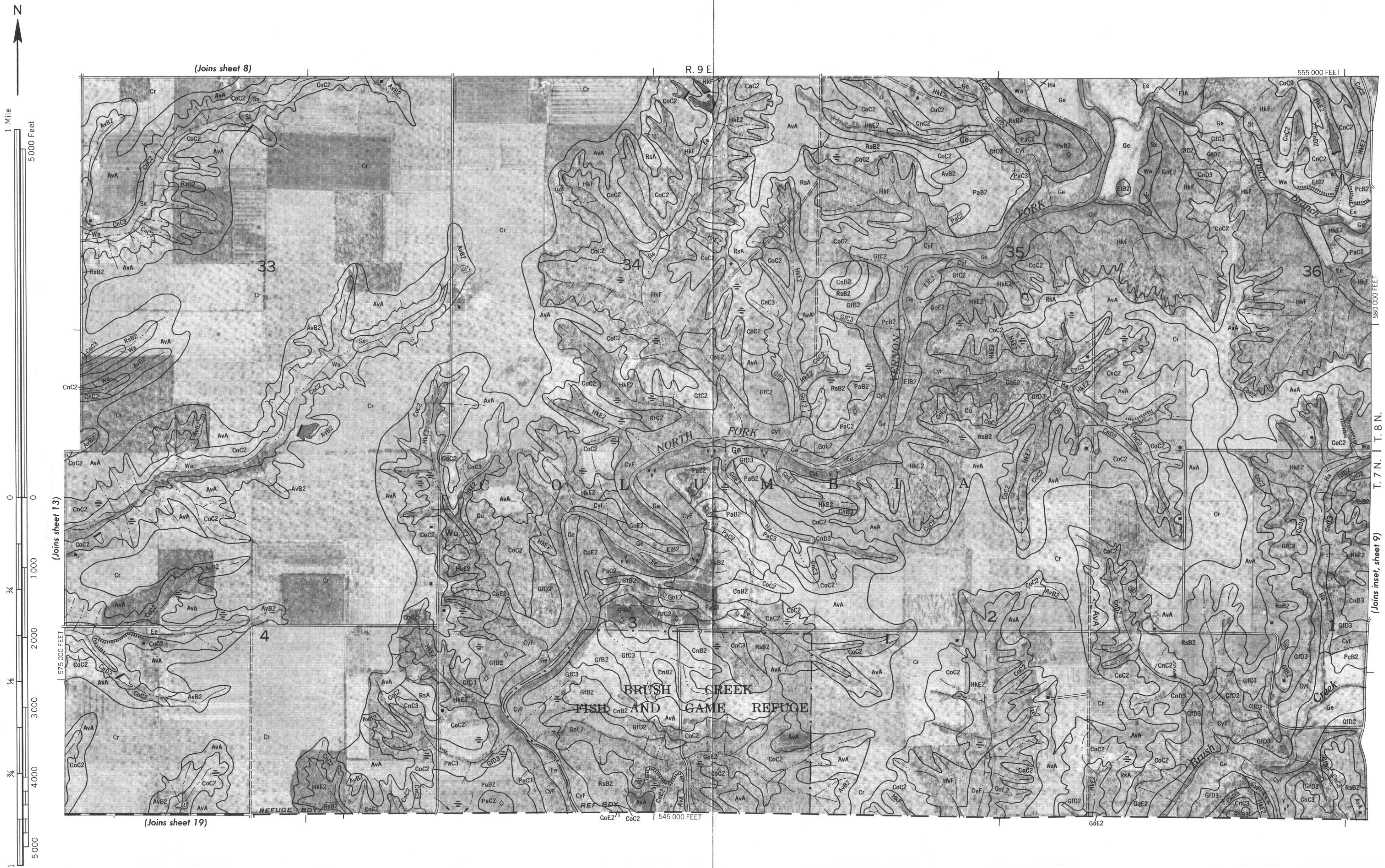
This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Purdue University Agricultural Experiment Station. Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone. Land division corners are approximately positioned on this map.

(14)

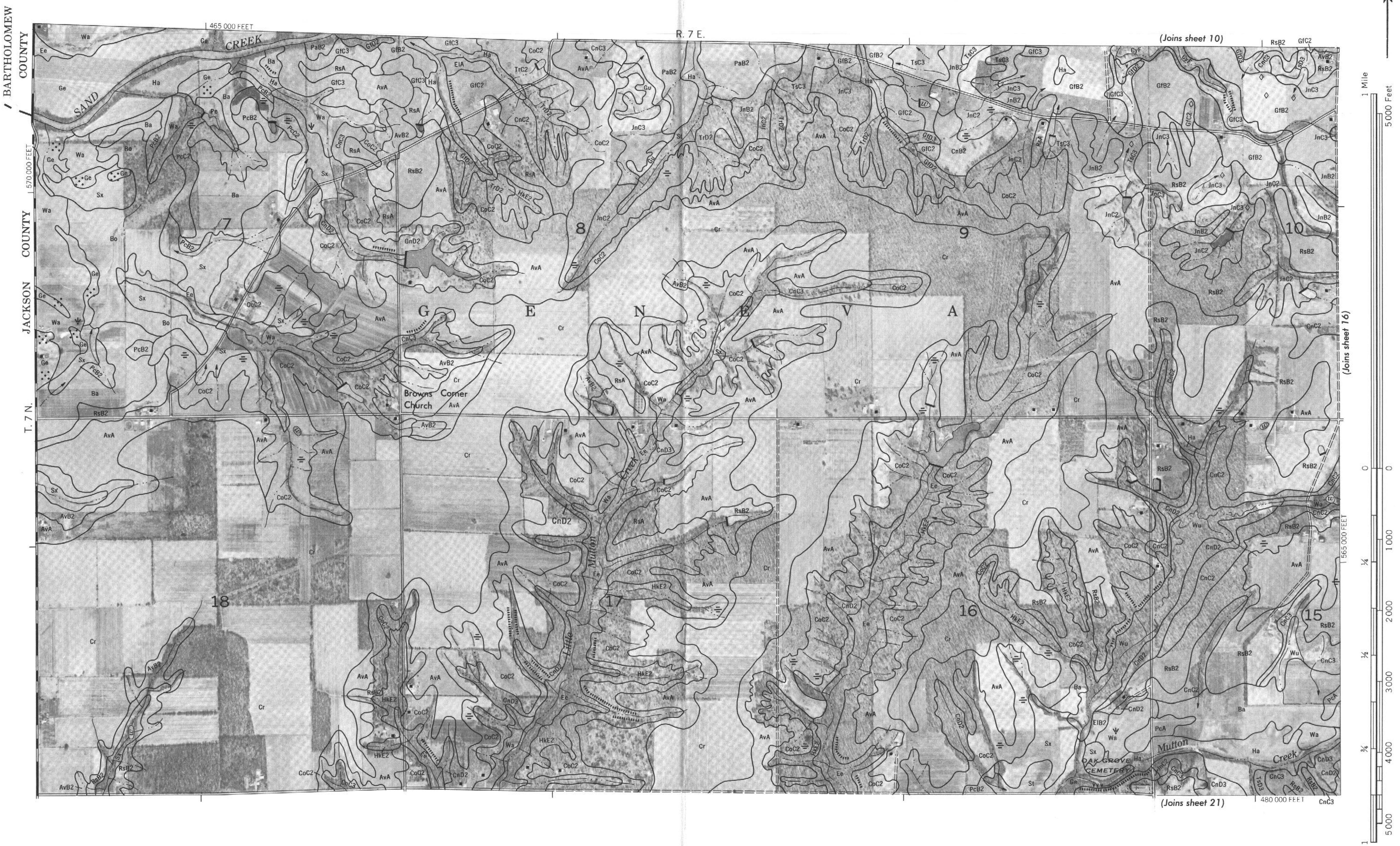


Land division corners are approximately positioned on this map.

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone.

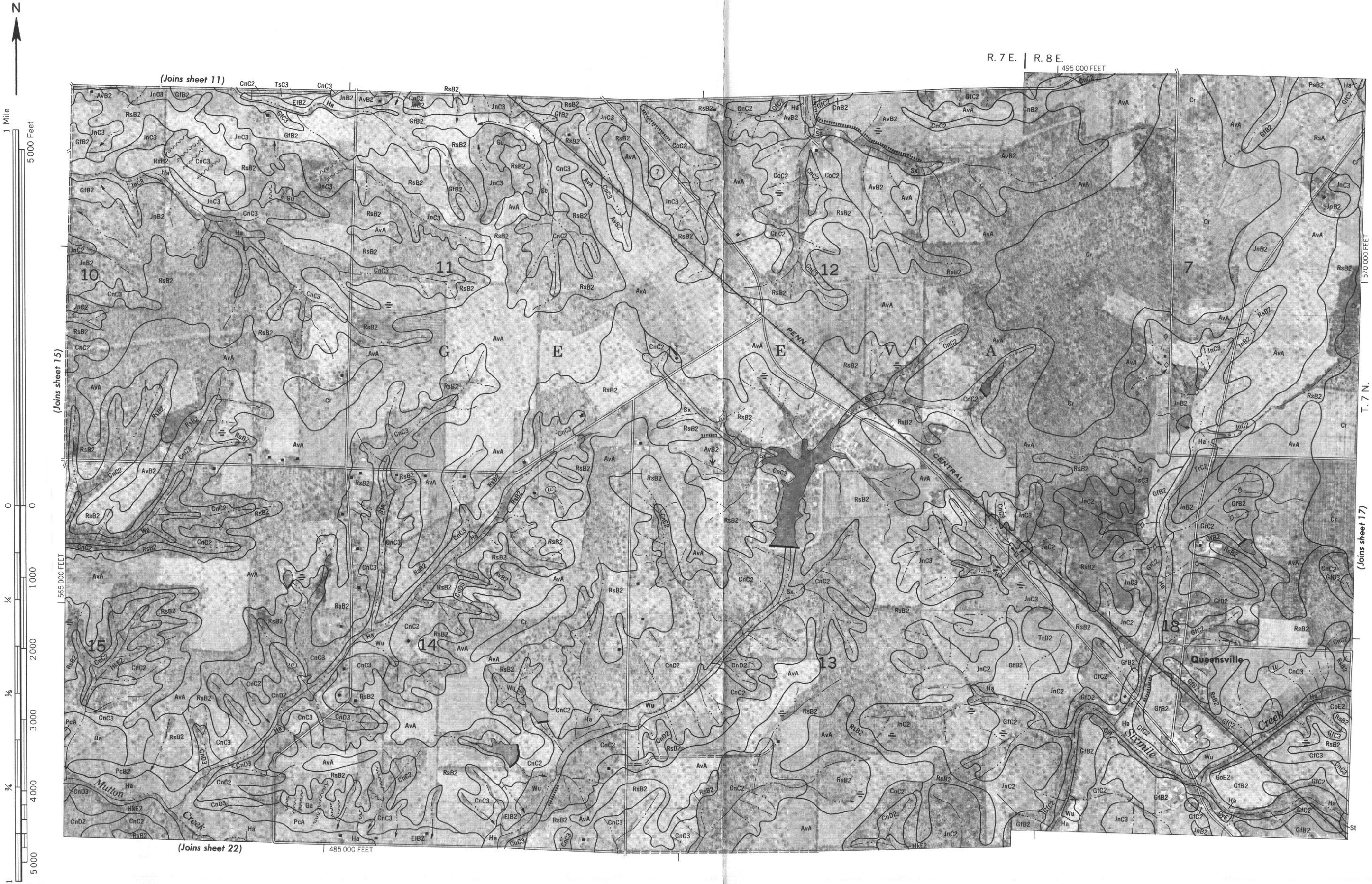
This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Purdue University Agricultural Experiment Station.

15



JENNINGS COUNTY, INDIANA NO. 15

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Purdue University Agricultural Experiment Station.
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone.
Land division corners are approximately positioned on this map.



Land division corners are approximately positioned on this map.

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone.

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JENNINGS COUNTY, INDIANA NO. 17

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Purdue University Agricultural Experiment Station.
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone.
Land division corners are approximately positioned on this map.

JENNINGS COUNTY, INDIANA — SHEET NUMBER 18

Land division corners are approximately positioned on this map.
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone.
This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Purdue University Agricultural Experiment Station.

JENNINGS COUNTY, INDIANA NO. 19

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Purdue University Agricultural Experiment Station.
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone.
Land division corners are approximately positioned on this map.

JENNINGS COUNTY, INDIANA — SHEET NUMBER 20

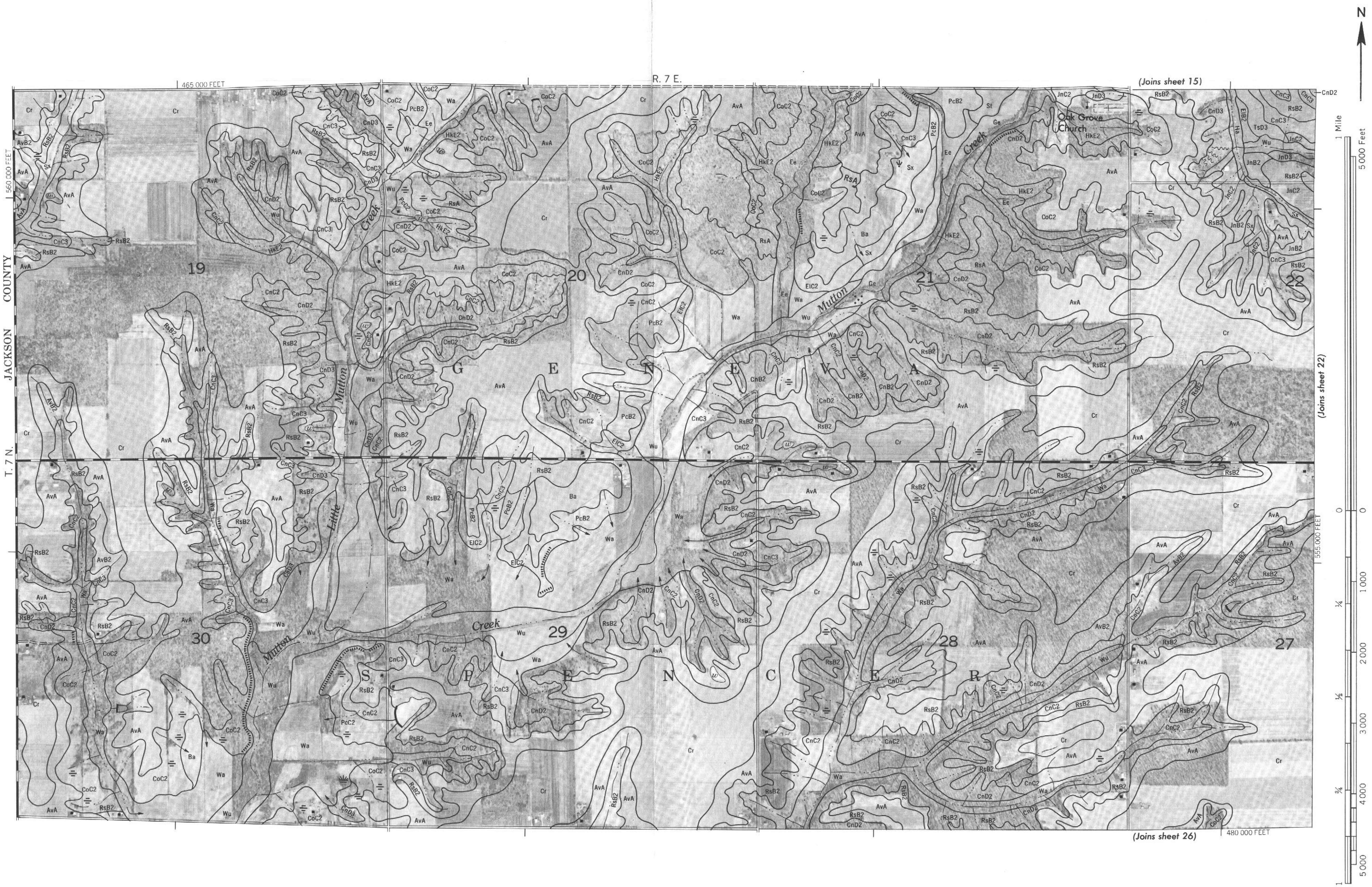
Land division corners are approximately positioned on this map.

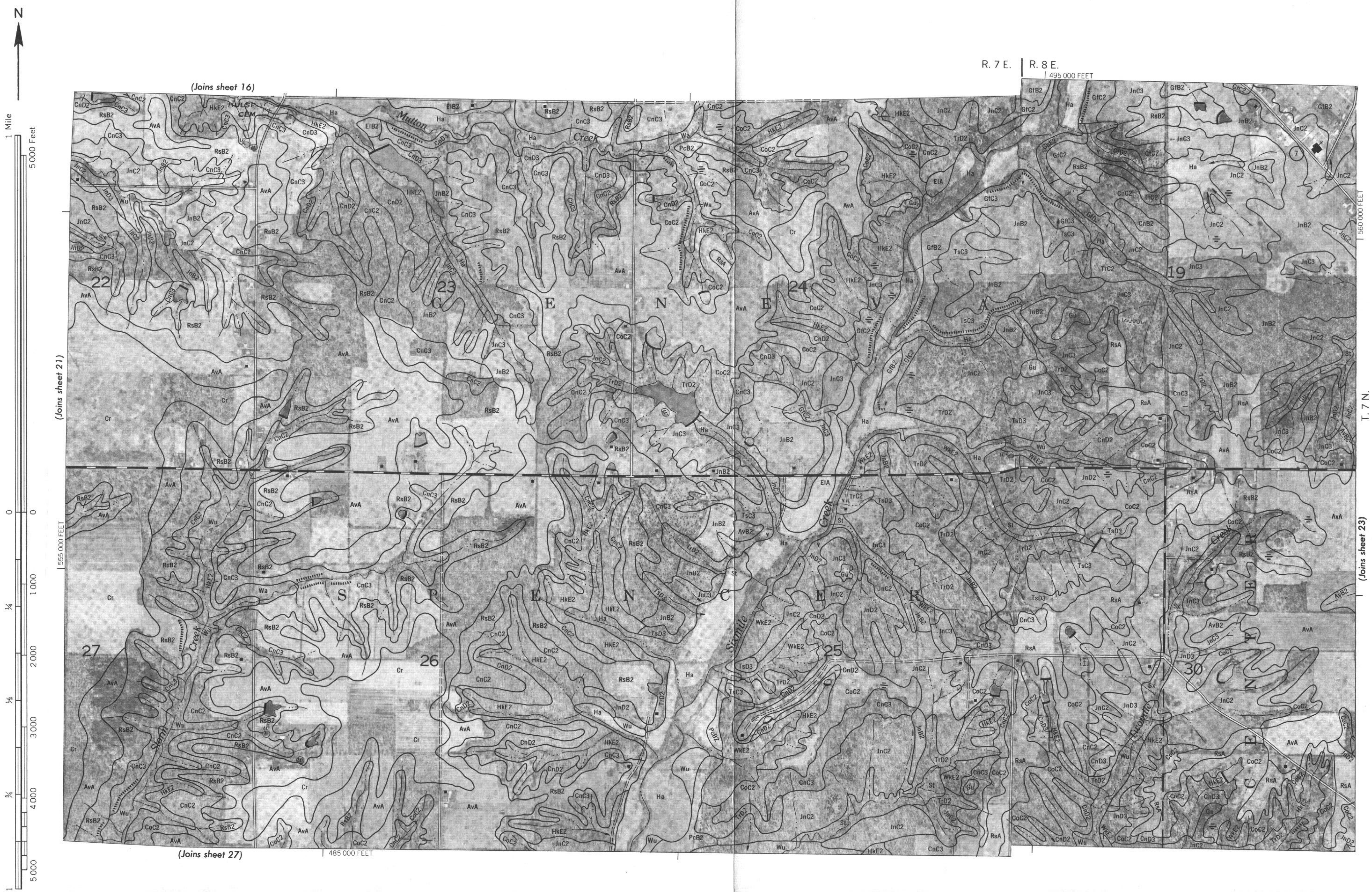
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone.

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Purdue University Agricultural Experiment Station.

JENNINGS COUNTY, INDIANA NO. 21

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Purdue University Agricultural Experiment Station.
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone.
Land division corners are approximately positioned on this map.





Land division corners are approximately positioned on this map.

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone.

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JENNINGS COUNTY, INDIANA NO. 23

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Purdue University Agricultural Experiment Station.

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone.

Land division corners are approximately positioned on this map.

JENNINGS COUNTY, INDIANA — SHEET NUMBER 24

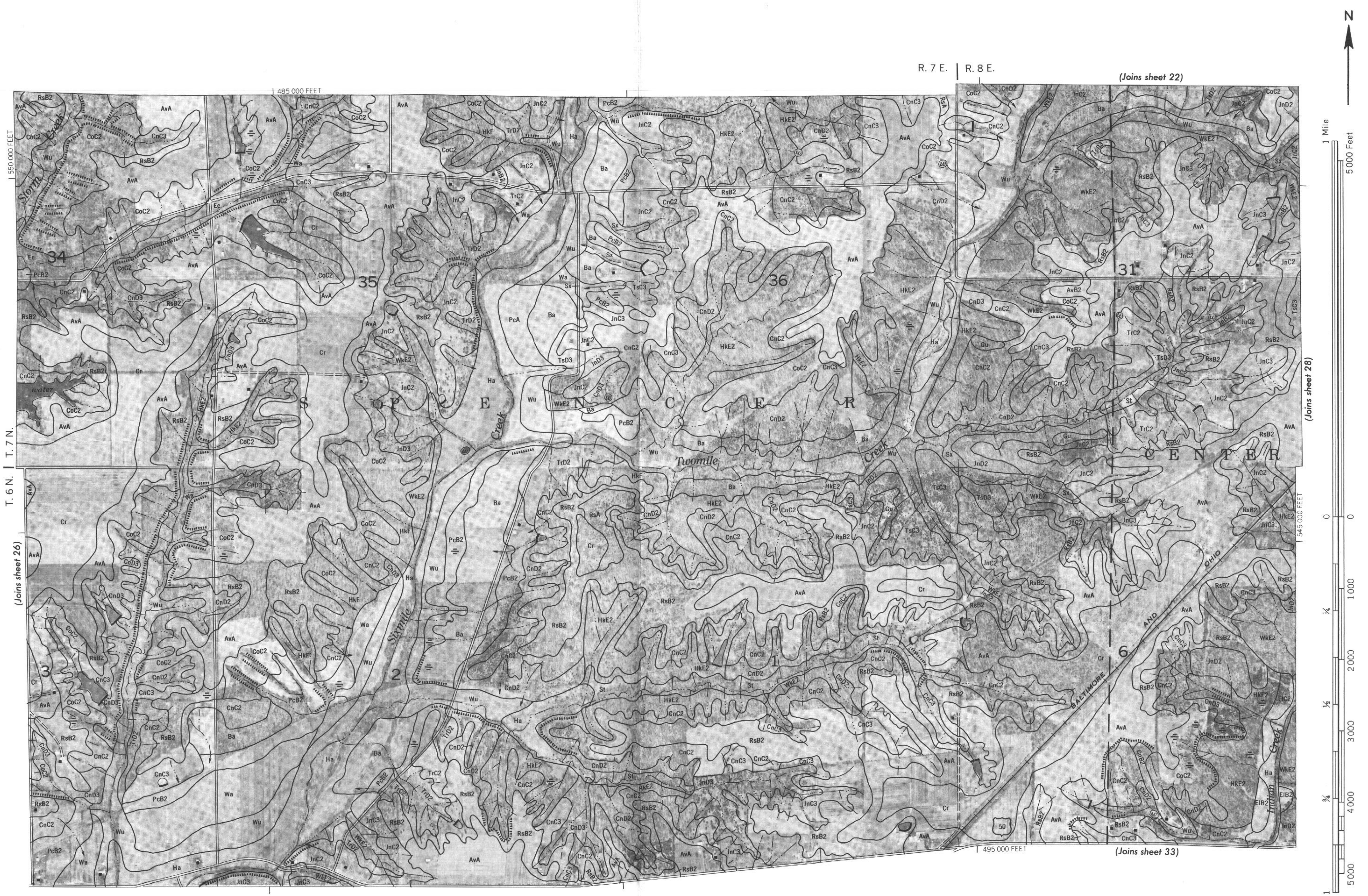
Land division corners are approximately positioned on this map.
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone.
This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Purdue University Agricultural Experiment Station.

JENNINGS COUNTY, INDIANA NO. 25

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Purdue University Agricultural Experiment Station.
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone.
Land division corners are approximately positioned on this map.

JENNINGS COUNTY, INDIANA — SHEET NUMBER 26

Land division corners are approximately positioned on this map.
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone.
This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Purdue University Agricultural Experiment Station.



This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Purdue University Agricultural Experiment Station.

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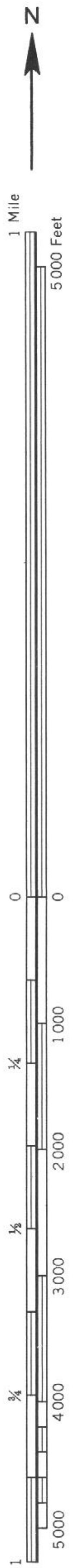
Land division corners are approximately positioned on this map.



Land division corners are approximately positioned on this map.
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone.
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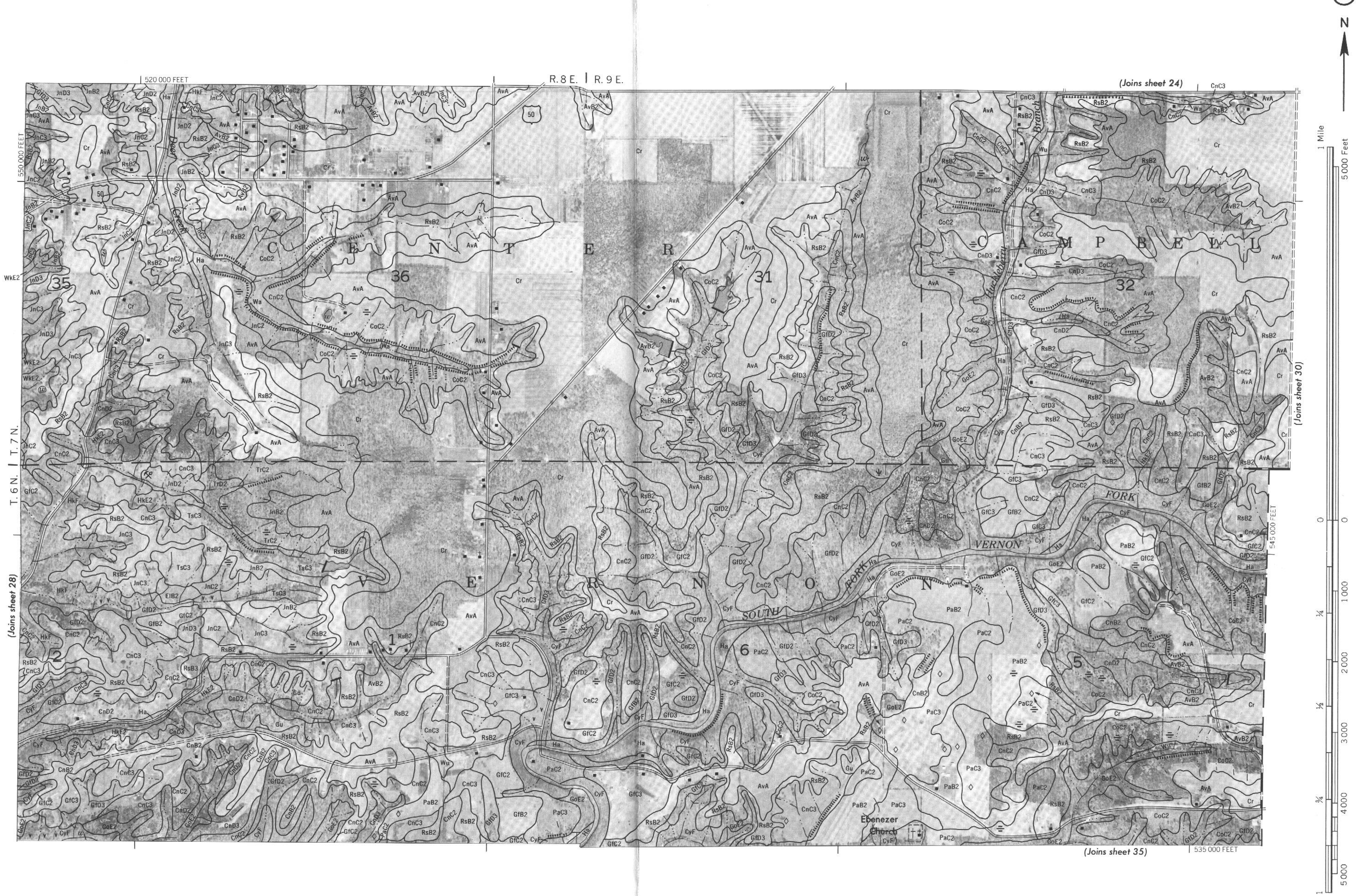
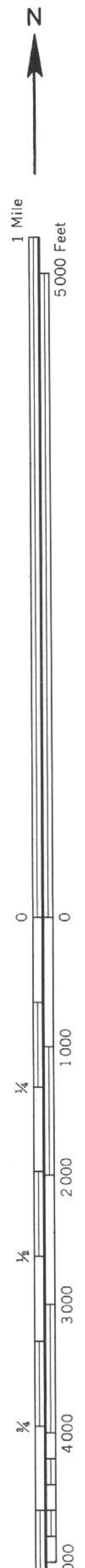
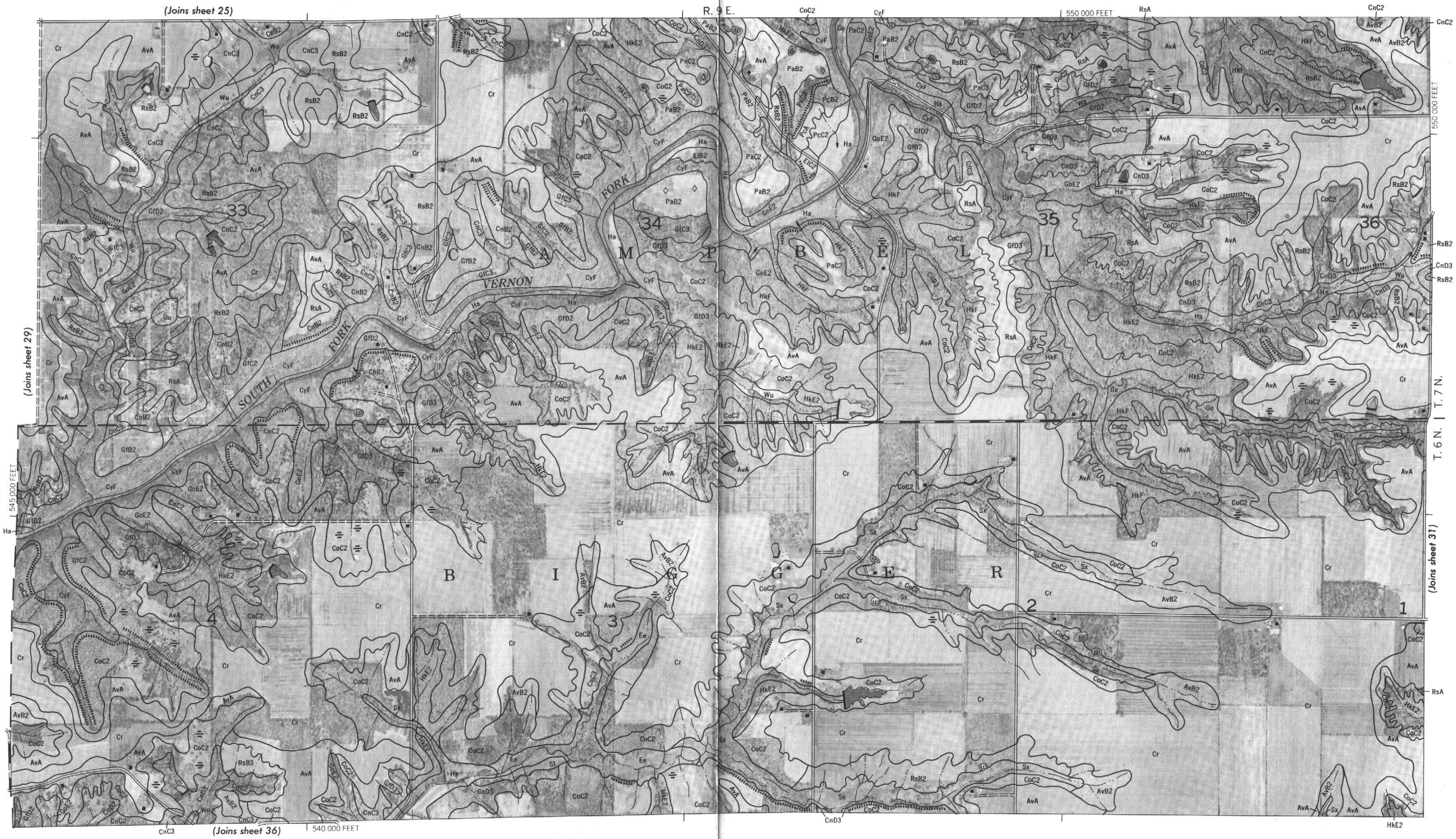


This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Purdue University Agricultural Experiment Station.
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone.
Land division corners are approximately positioned on this map.





Land division corners are approximately positioned on this map.

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone.

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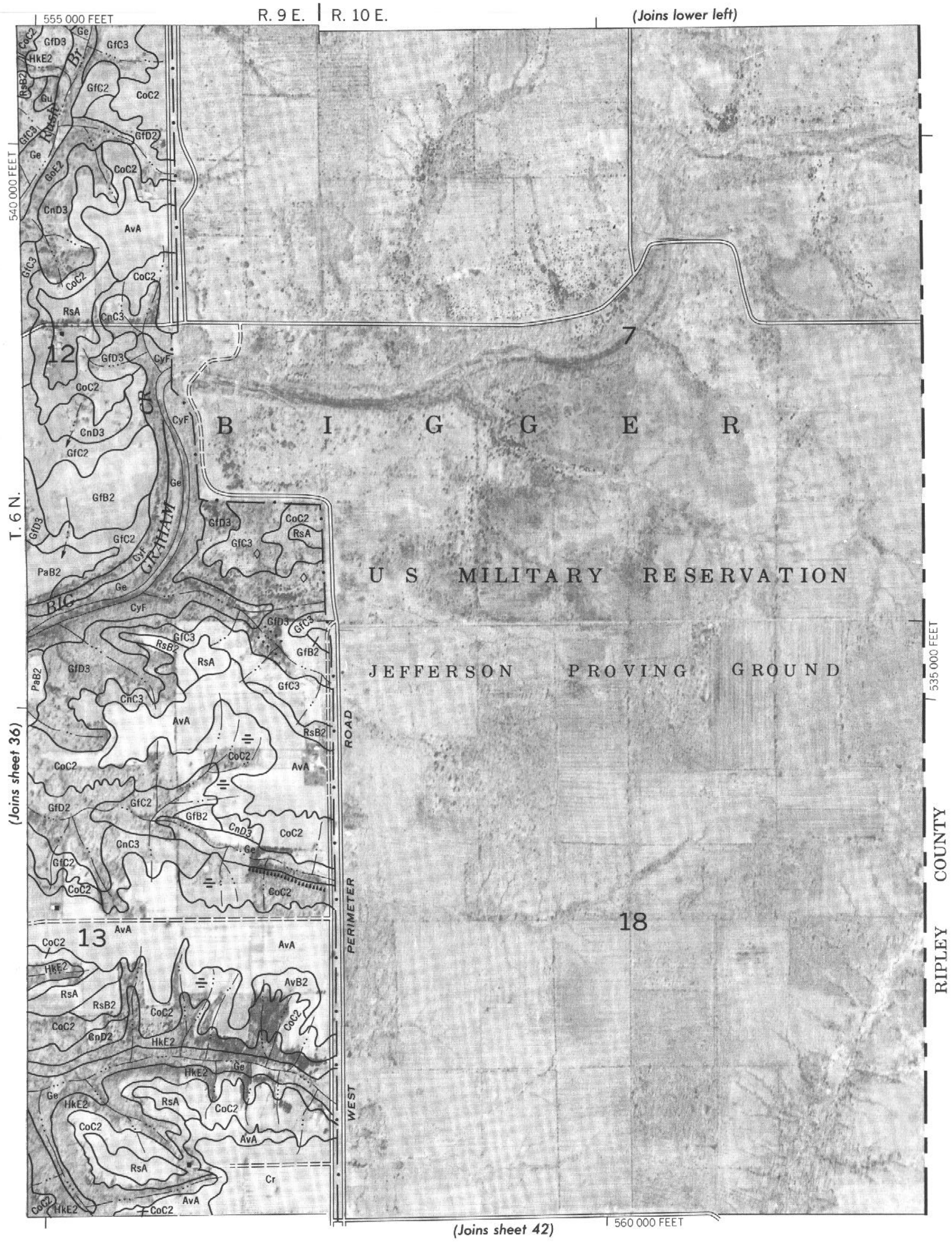
JENNINGS COUNTY, INDIANA NO. 31

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Purdue University Agricultural Experiment Station.
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone.
Land division corners are approximately positioned on this map.



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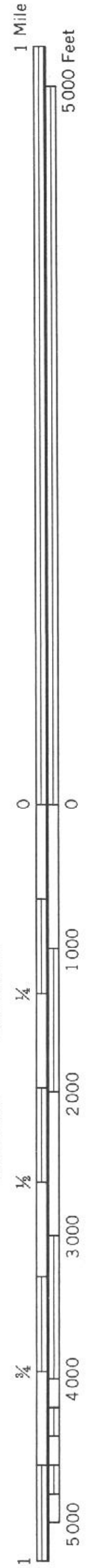

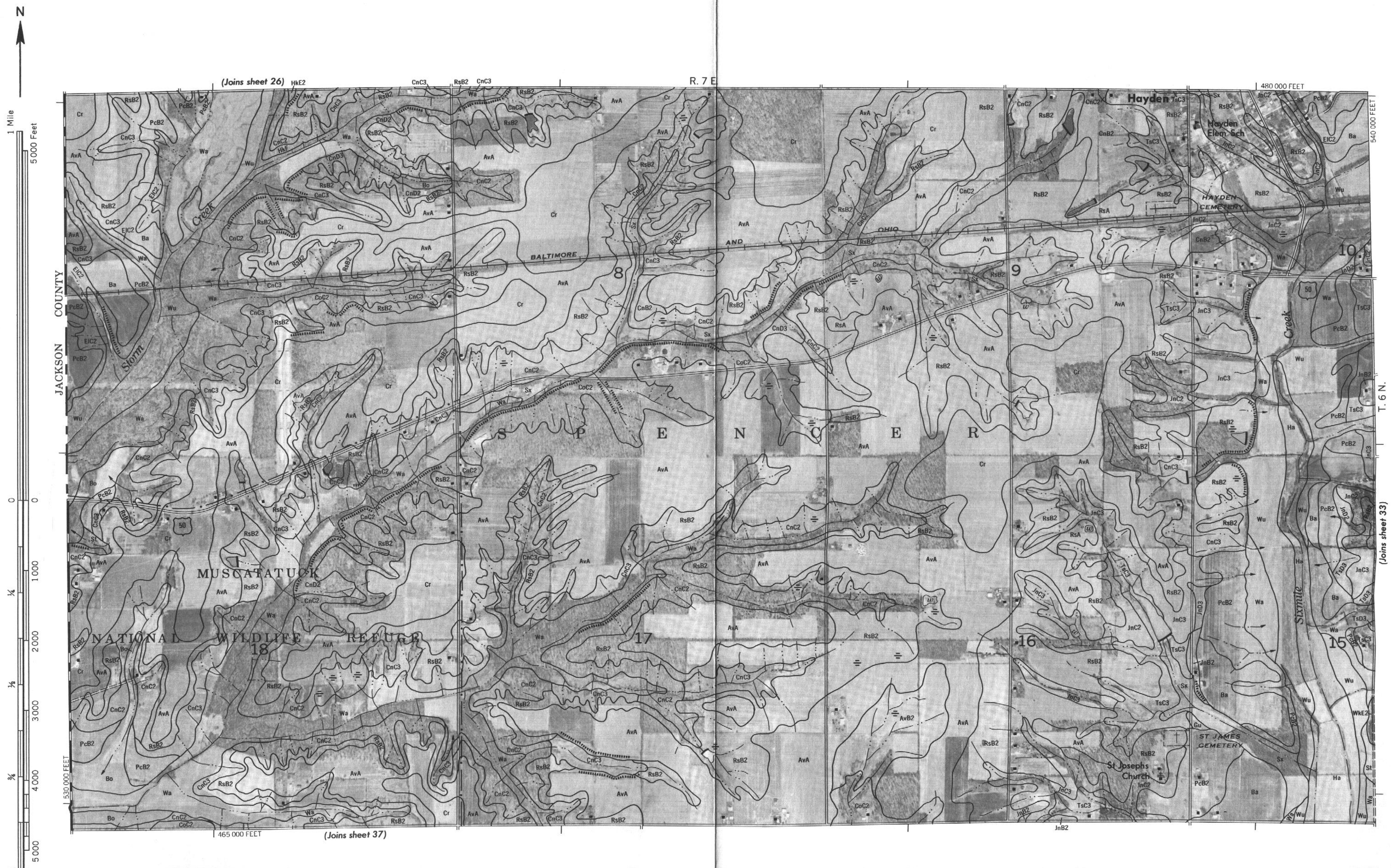

Land division corners are approximately positioned on this map.

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone.

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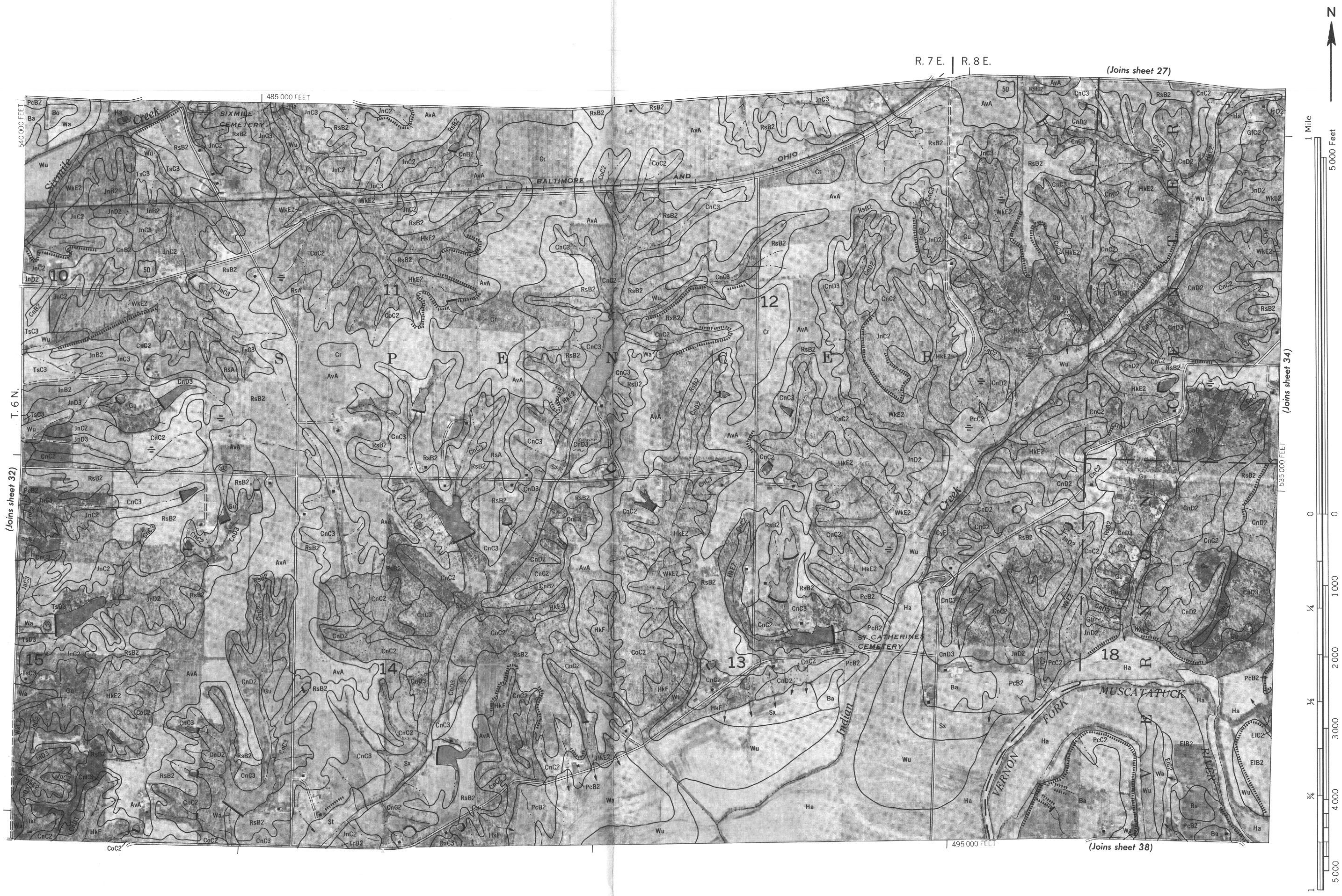
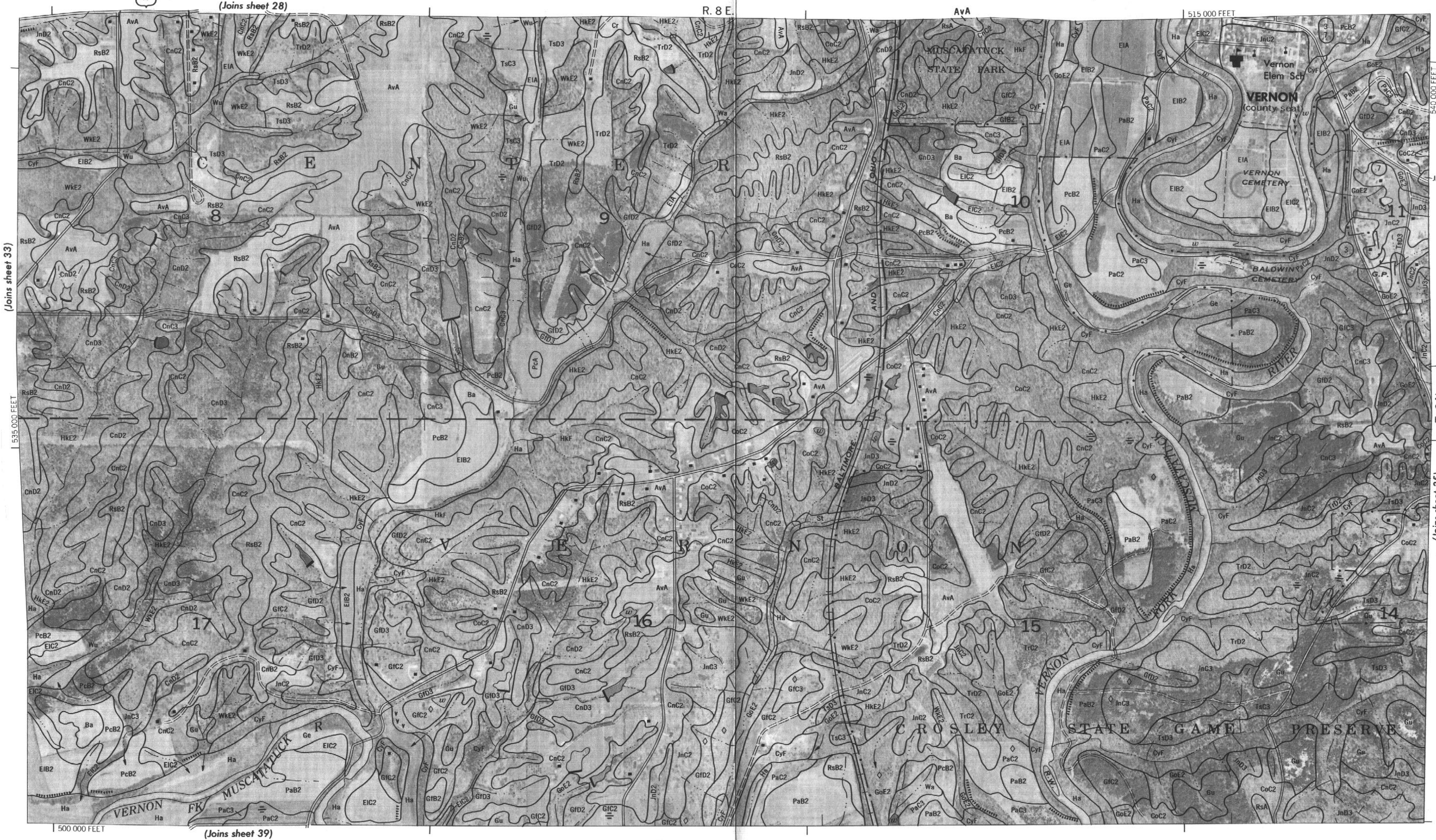
JENNINGS COUNTY, INDIANA NO. 33

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Purdue University Agricultural Experiment Station. Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone. Land division corners are approximately positioned on this map.





Land division corners are approximately positioned on this map.

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone.

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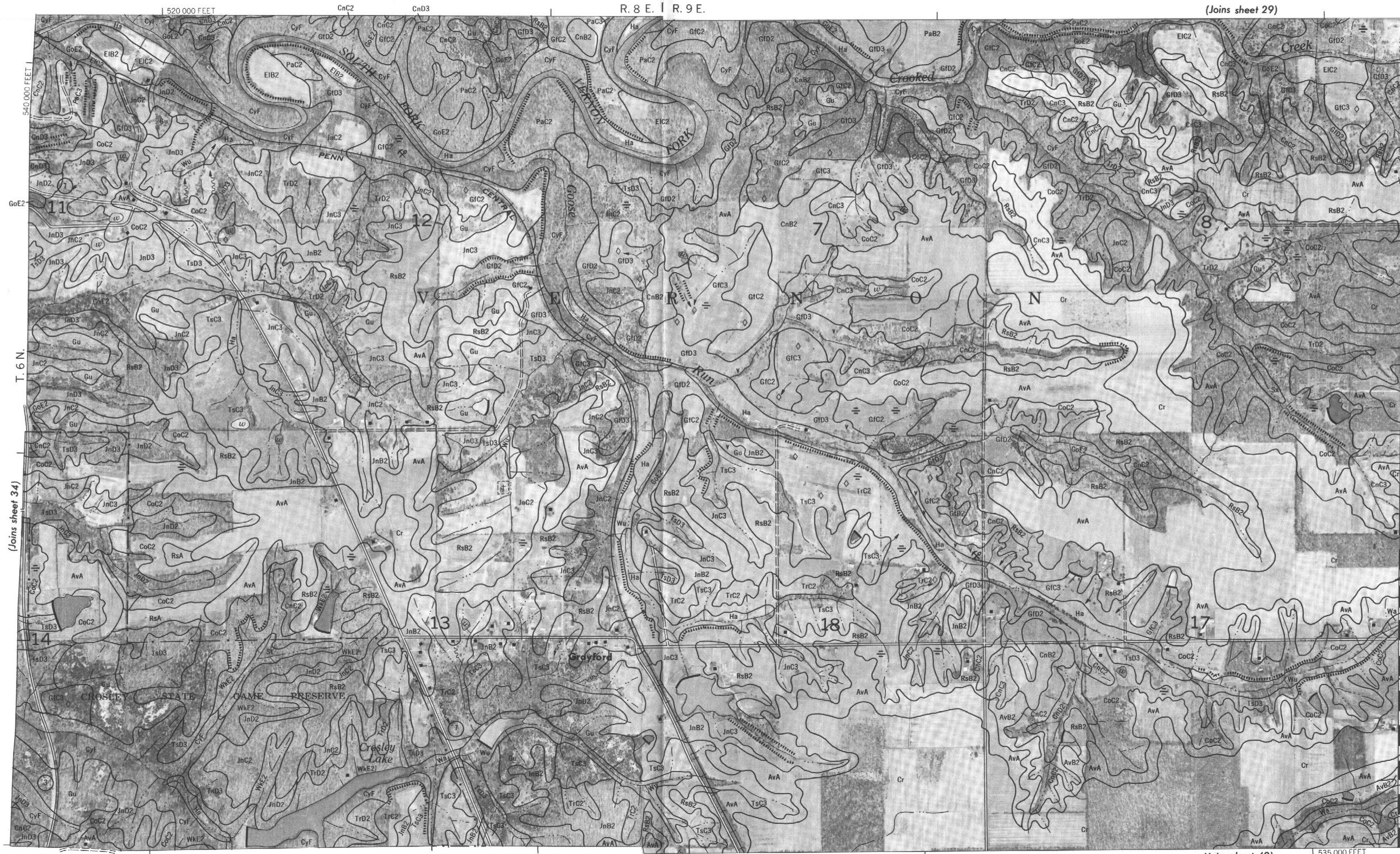
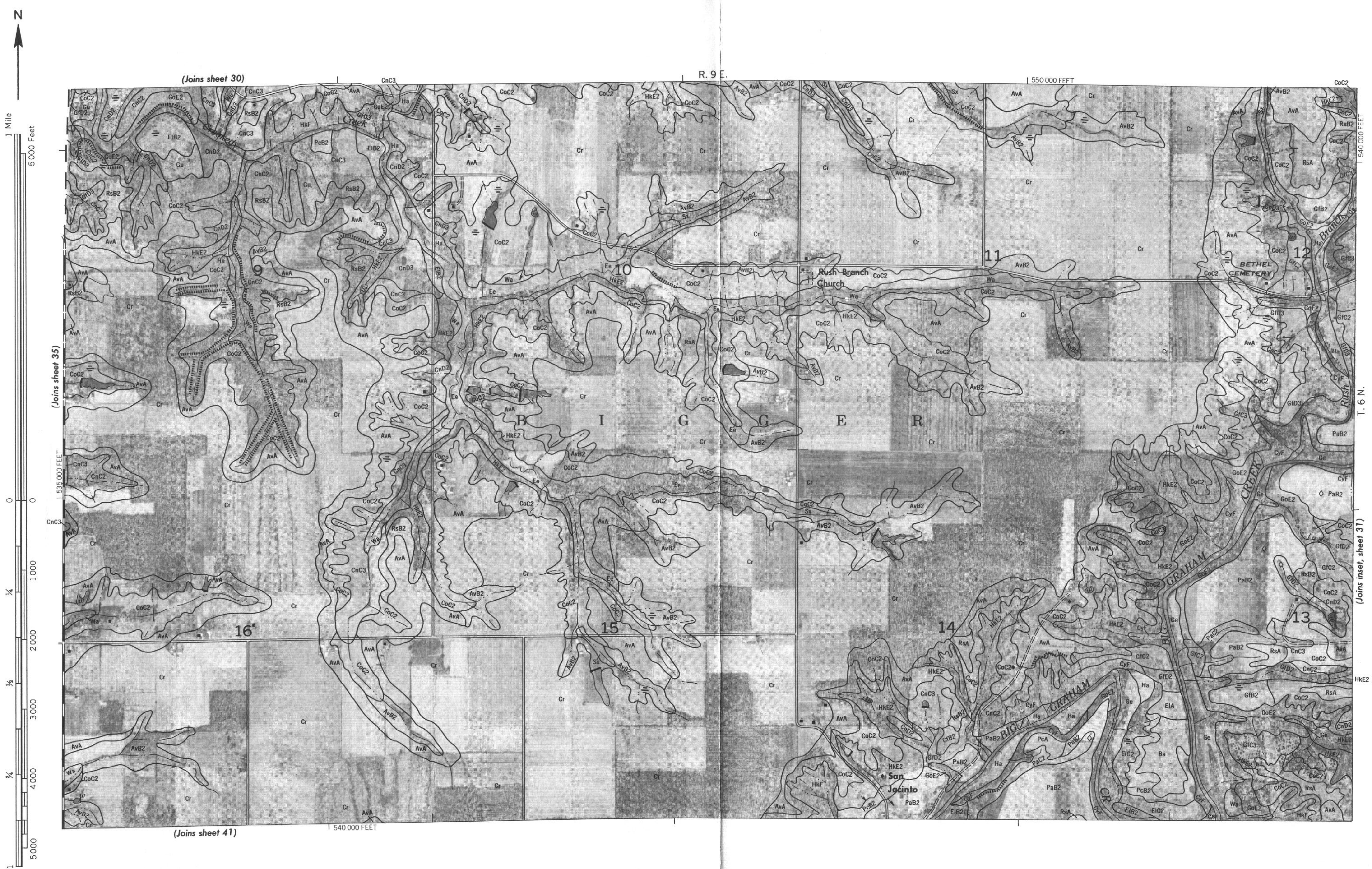
JENNINGS COUNTY, INDIANA NO. 35

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Purdue University Agricultural Experiment Station.
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone.
Land division corners are approximately positioned on this map.



N

1 Mile
5000 Feet
0
1000
2000
3000
4000
5000
¼
½
¾
1



Land division corners are approximately positioned on this map.

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone.

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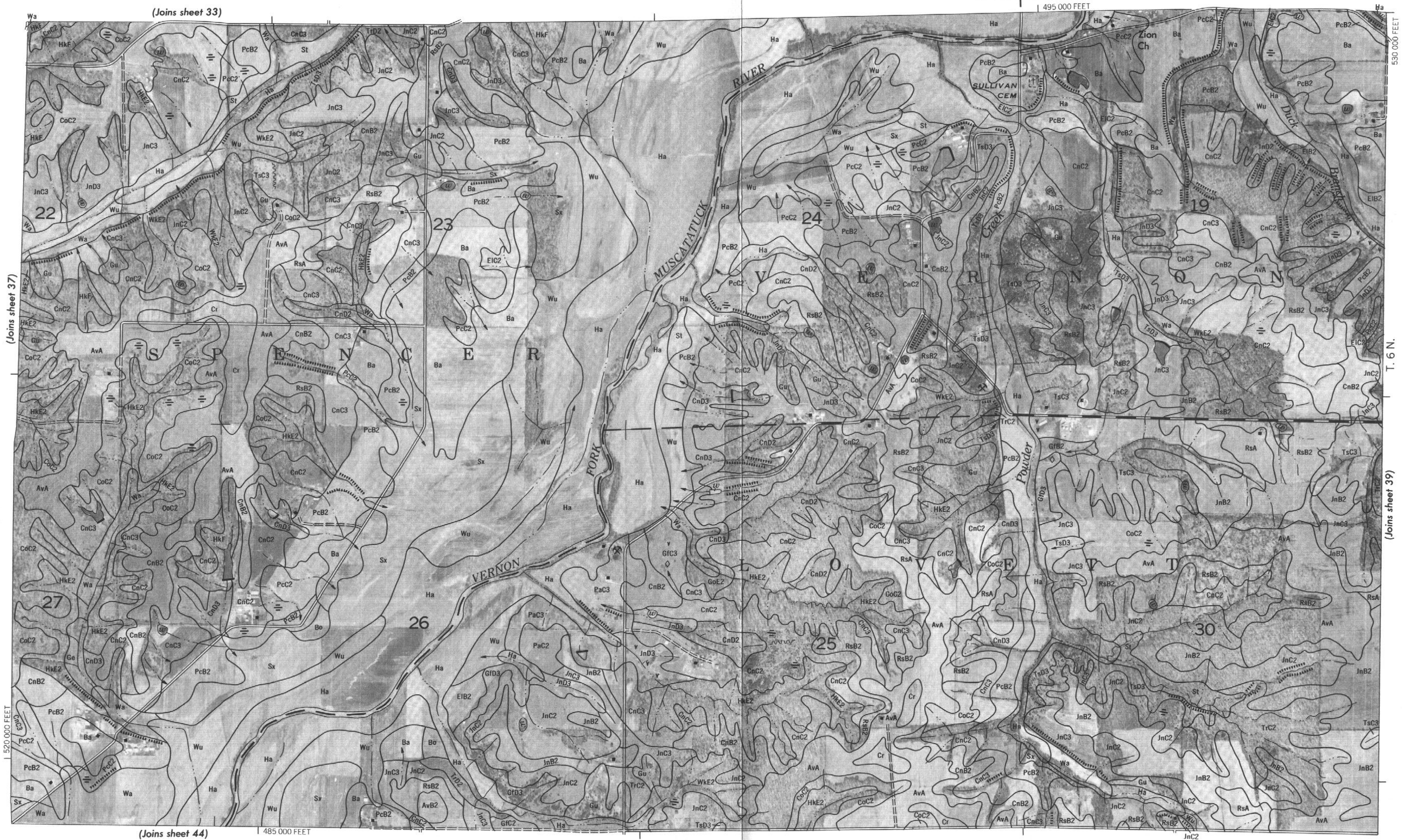
JENNINGS COUNTY, INDIANA NO. 37

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service and the Purdue University Agricultural Experiment Station.
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone.
Land division corners are approximately positioned on this map.

JENNINGS COUNTY, INDIANA — SHEET NUMBER 38

N

1 Mile
5 000 Feet
0
1 000
2 000
3 000
4 000
5 000



Land division corners are approximately positioned on this map.

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone.

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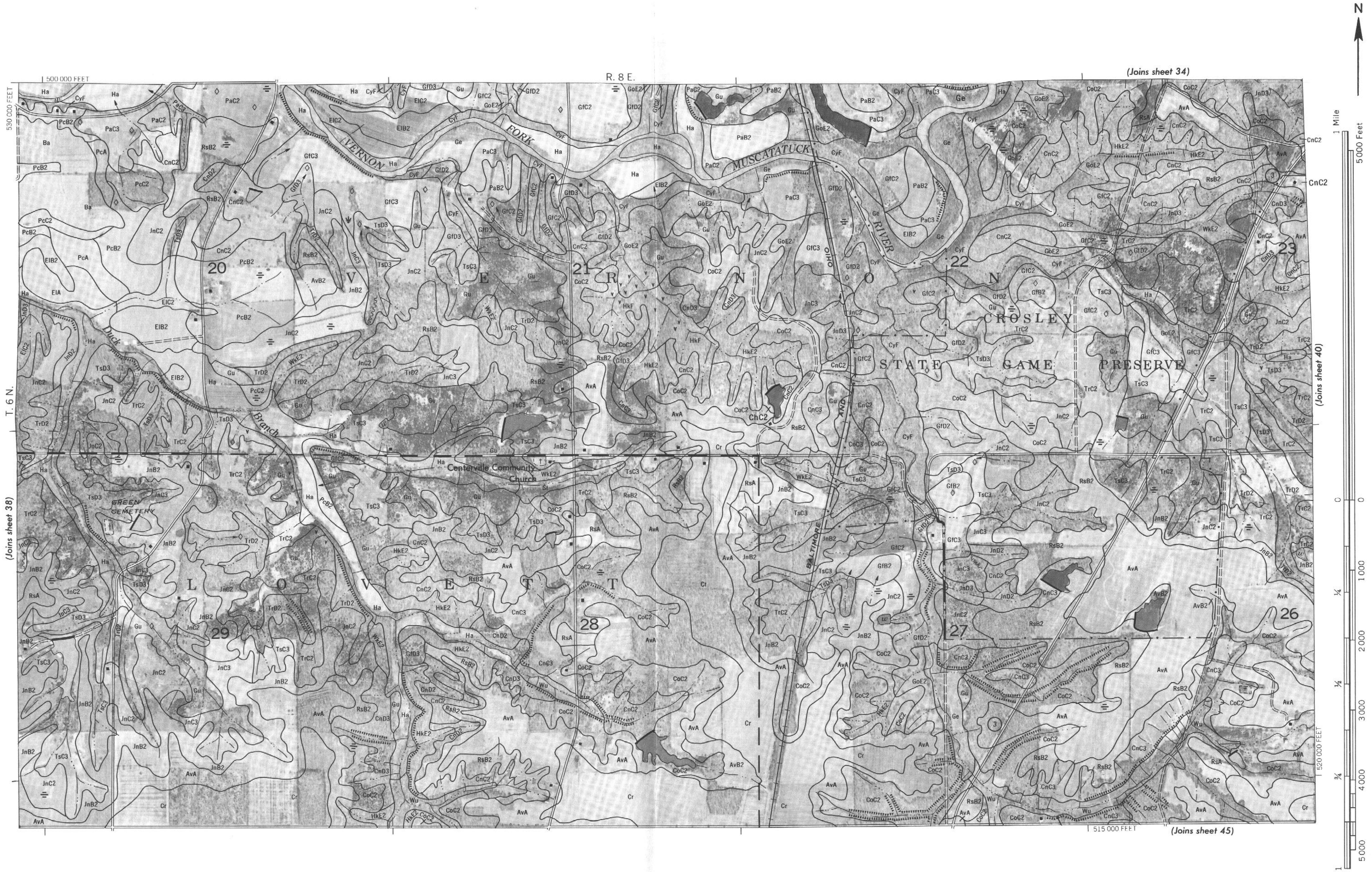
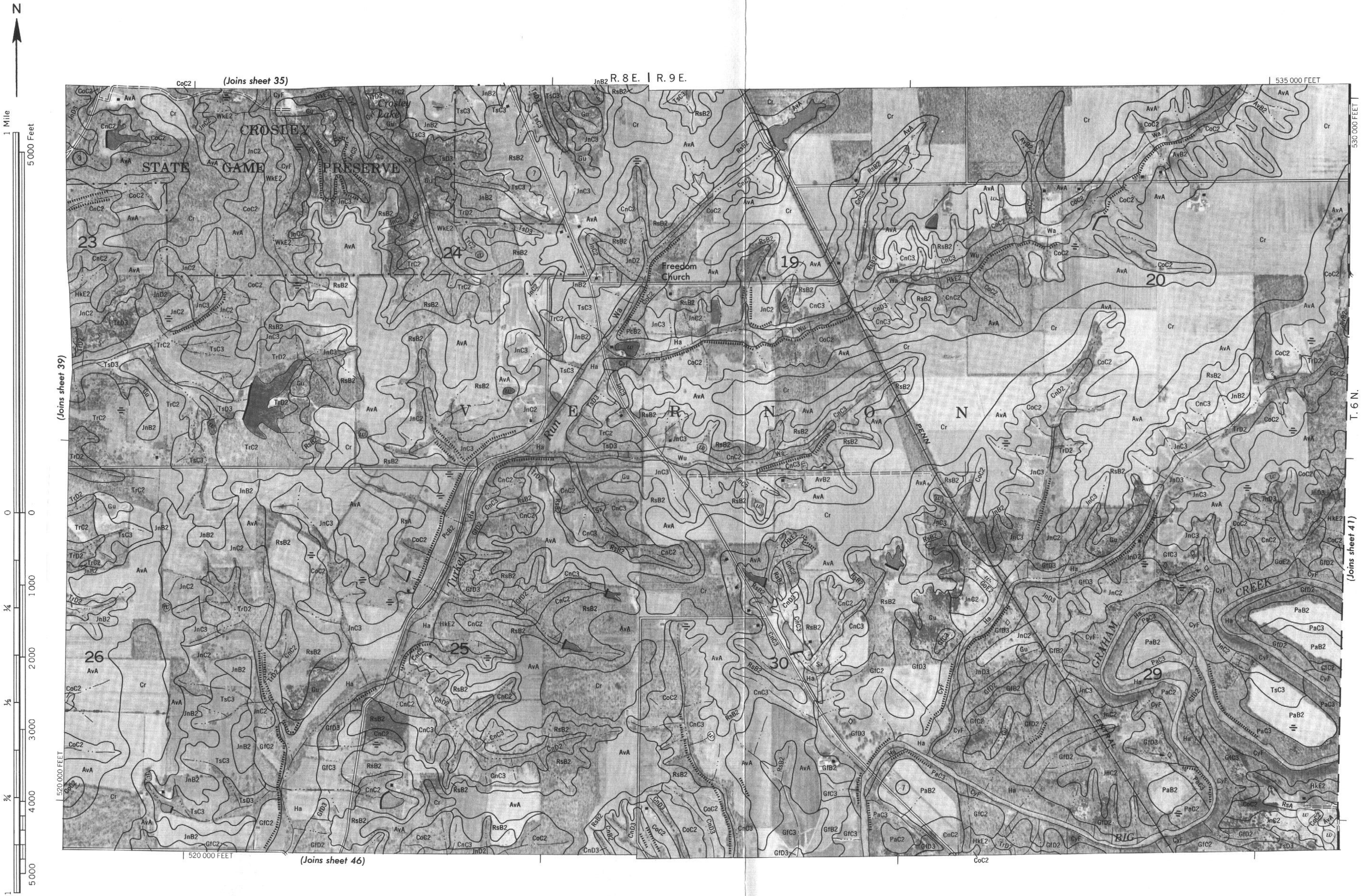


JENNINGS COUNTY, INDIANA NO. 39

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Purdue University Agricultural Experiment Station.
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone.
Land division corners are approximately positioned on this map.



Land division corners are approximately positioned on this map.
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone.
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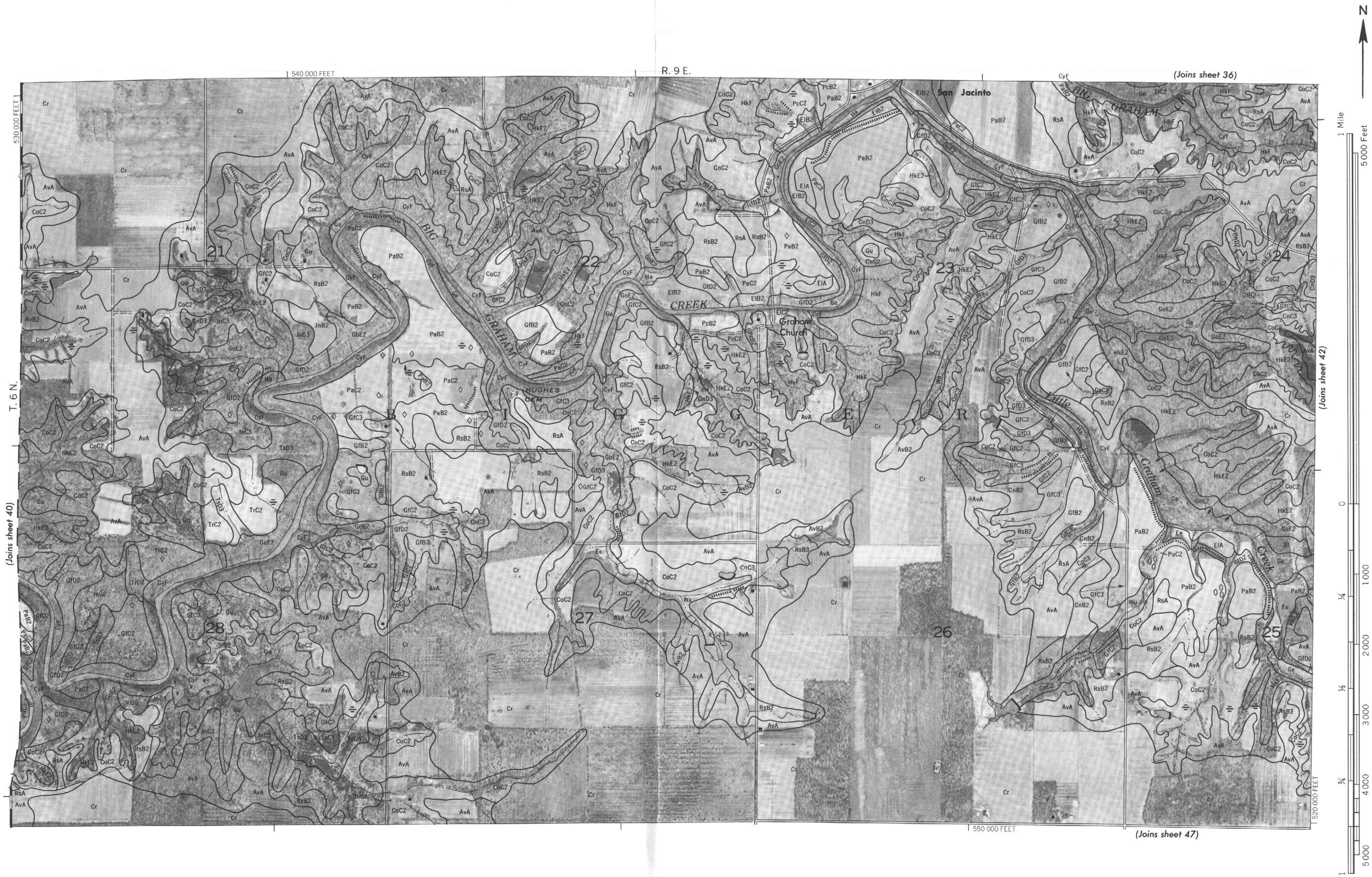
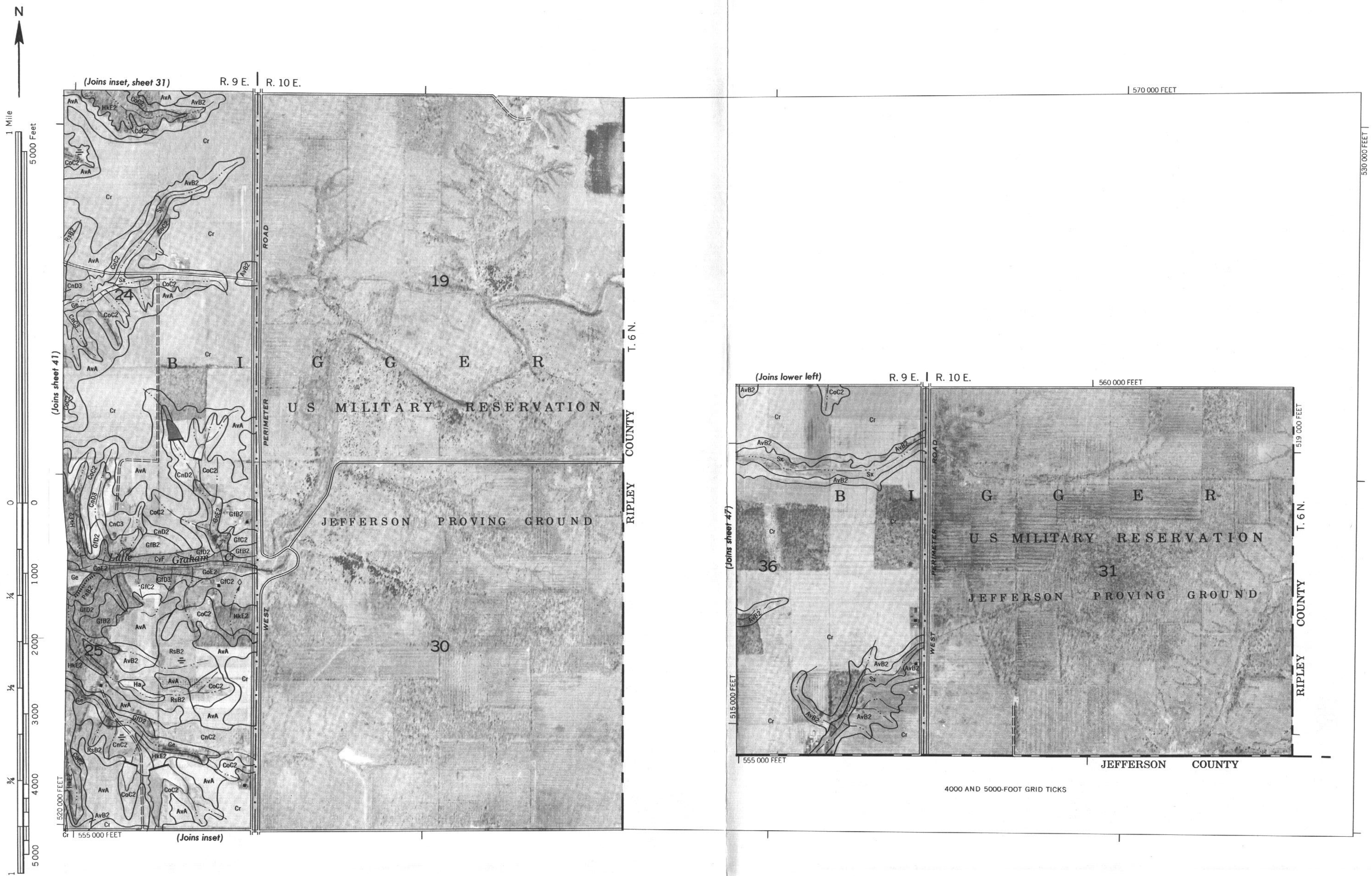


JENNINGS COUNTY, INDIANA NO. 41

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Purdue University Agricultural Experiment Station.
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone.
Land division corners are approximately positioned on this map.

JENNINGS COUNTY, INDIANA — SHEET NUMBER 42



Land division corners are approximately positioned on this map.

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone.

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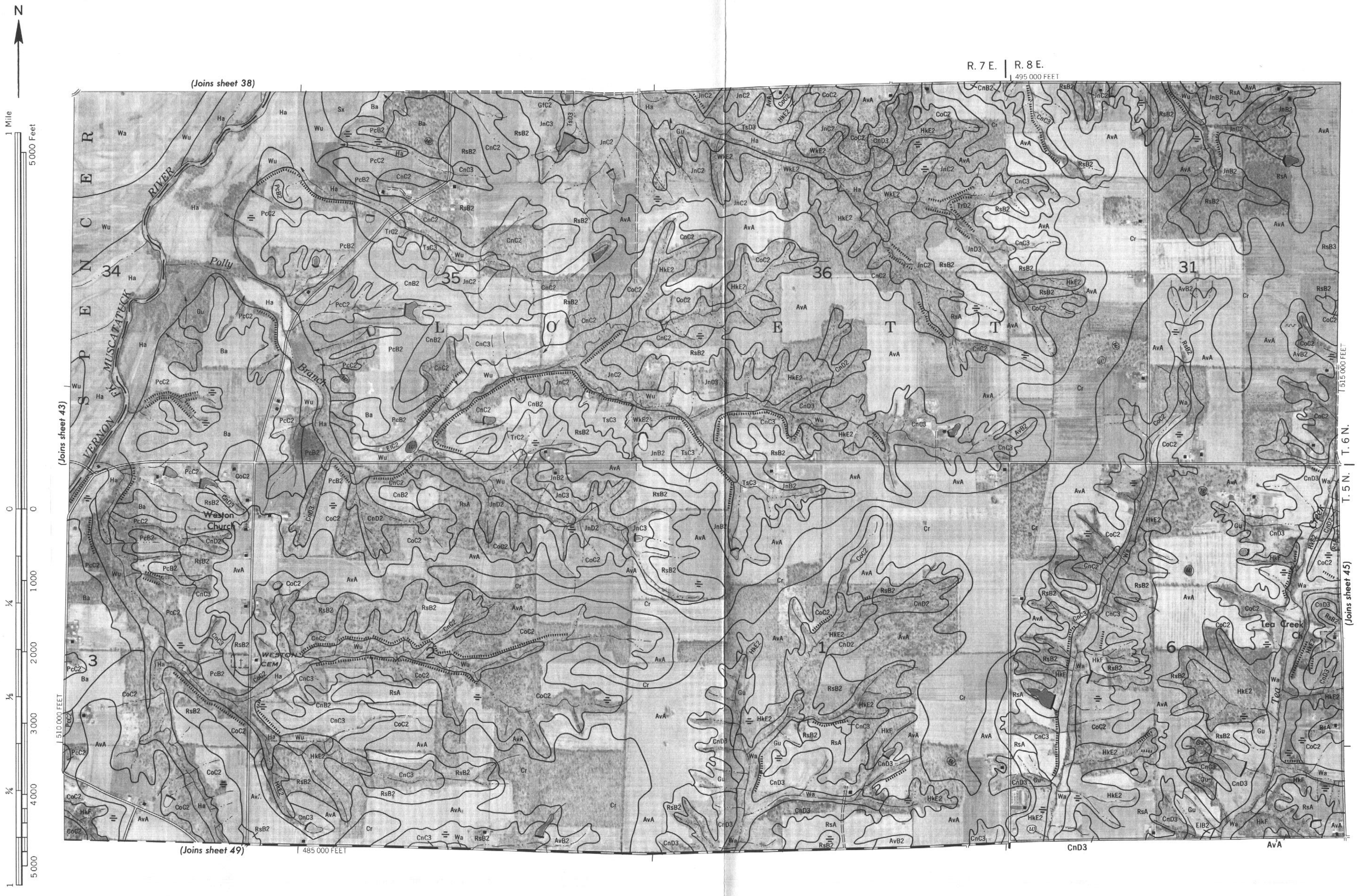
JENNINGS COUNTY, INDIANA NO. 43

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Purdue University Agricultural Experiment Station.
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone.
Land division corners are approximately positioned on this map.



Land division corners are approximately positioned on this map.

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone.

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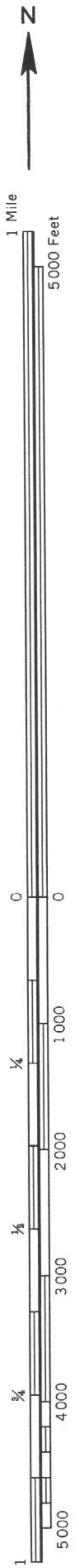
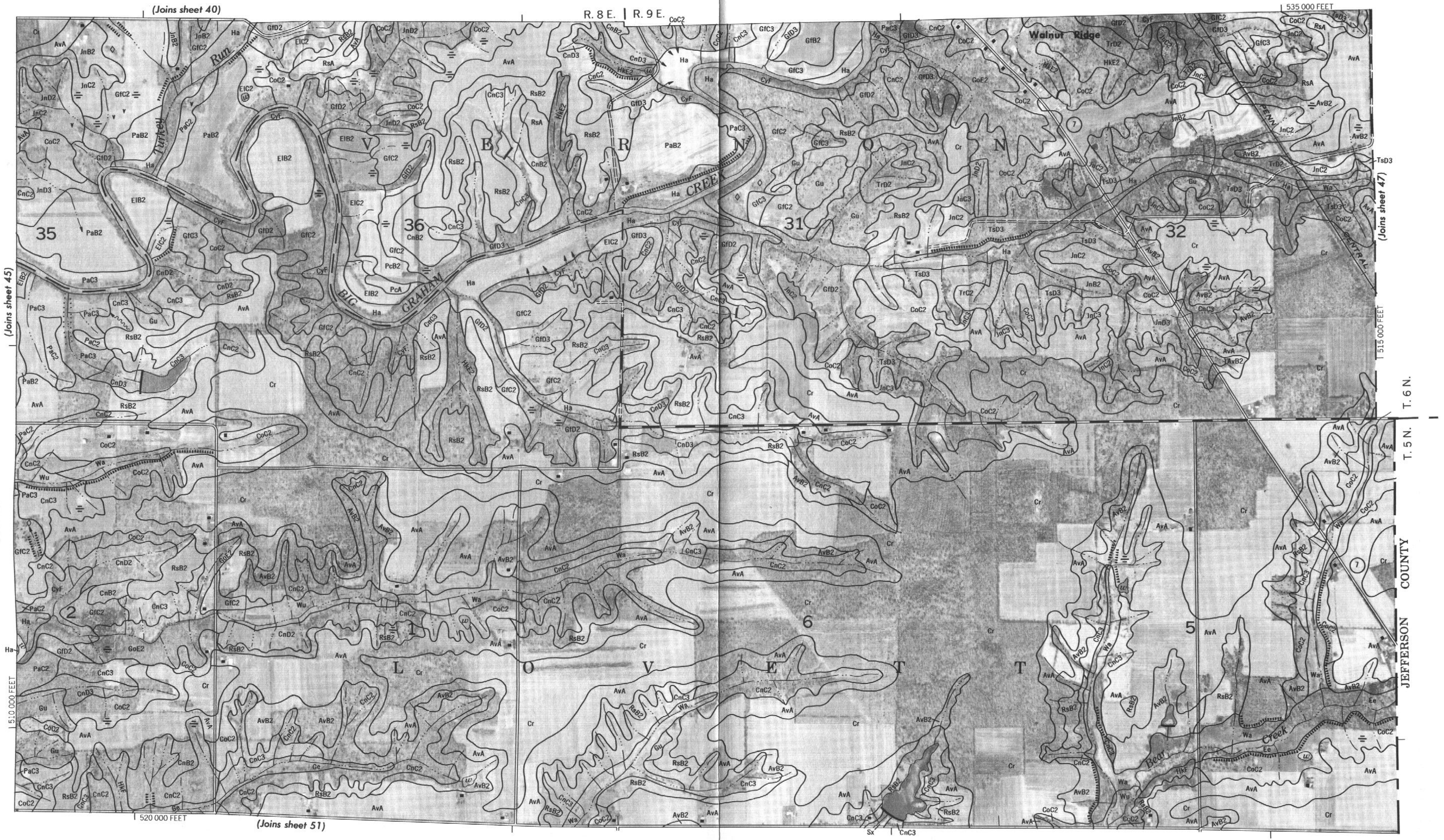
JENNINGS COUNTY, INDIANA — SHEET NUMBER 45

JENNINGS COUNTY, INDIANA NO. 45

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Purdue University Agricultural Experiment Station. Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone. Land division corners are approximately positioned on this map.

JENNINGS COUNTY, INDIANA — SHEET NUMBER 46





Land division corners are approximately positioned on this map.

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone.

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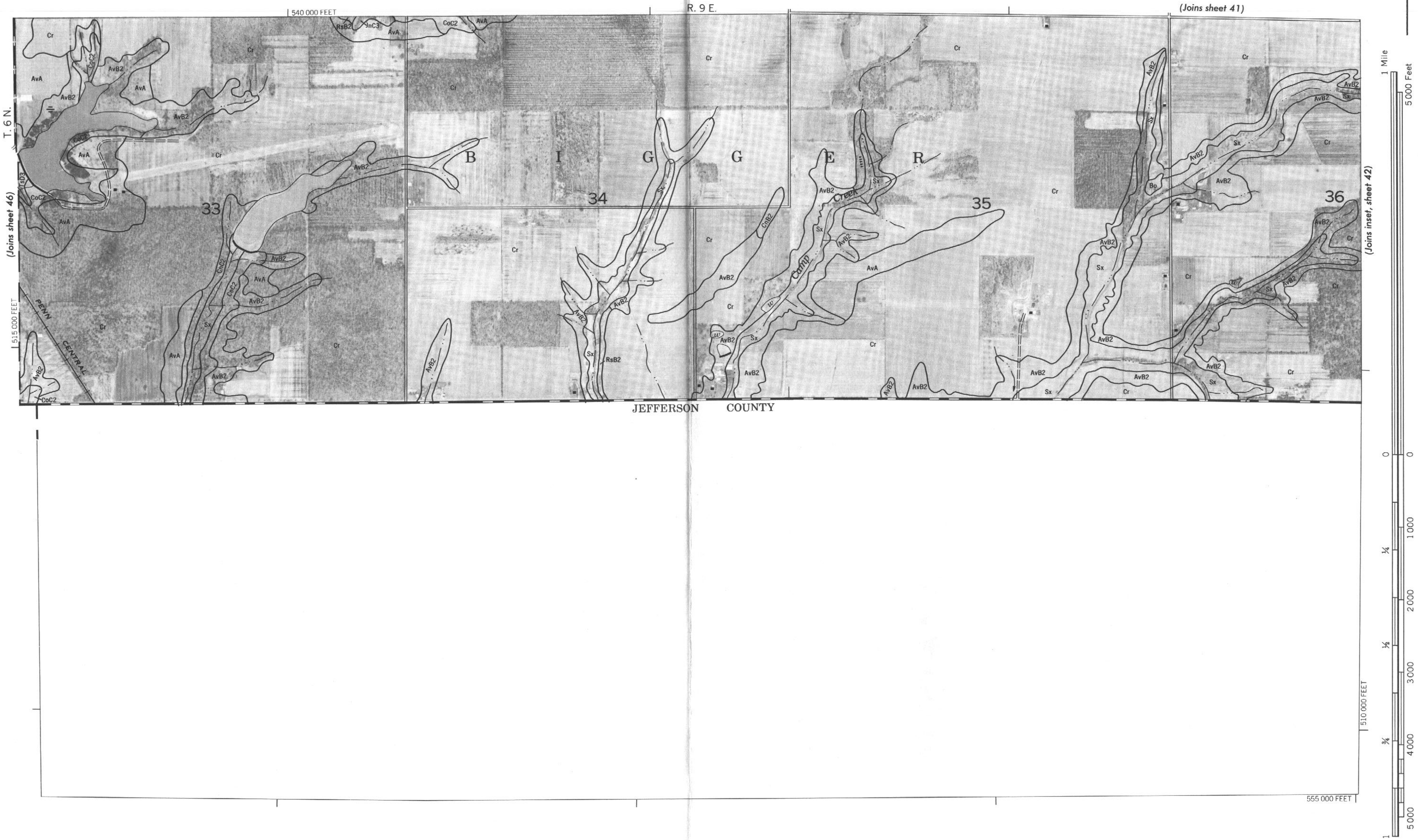
JENNINGS COUNTY, INDIANA NO. 47

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Purdue University Agricultural Experiment Station.
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone.
Land division corners are approximately positioned on this map.



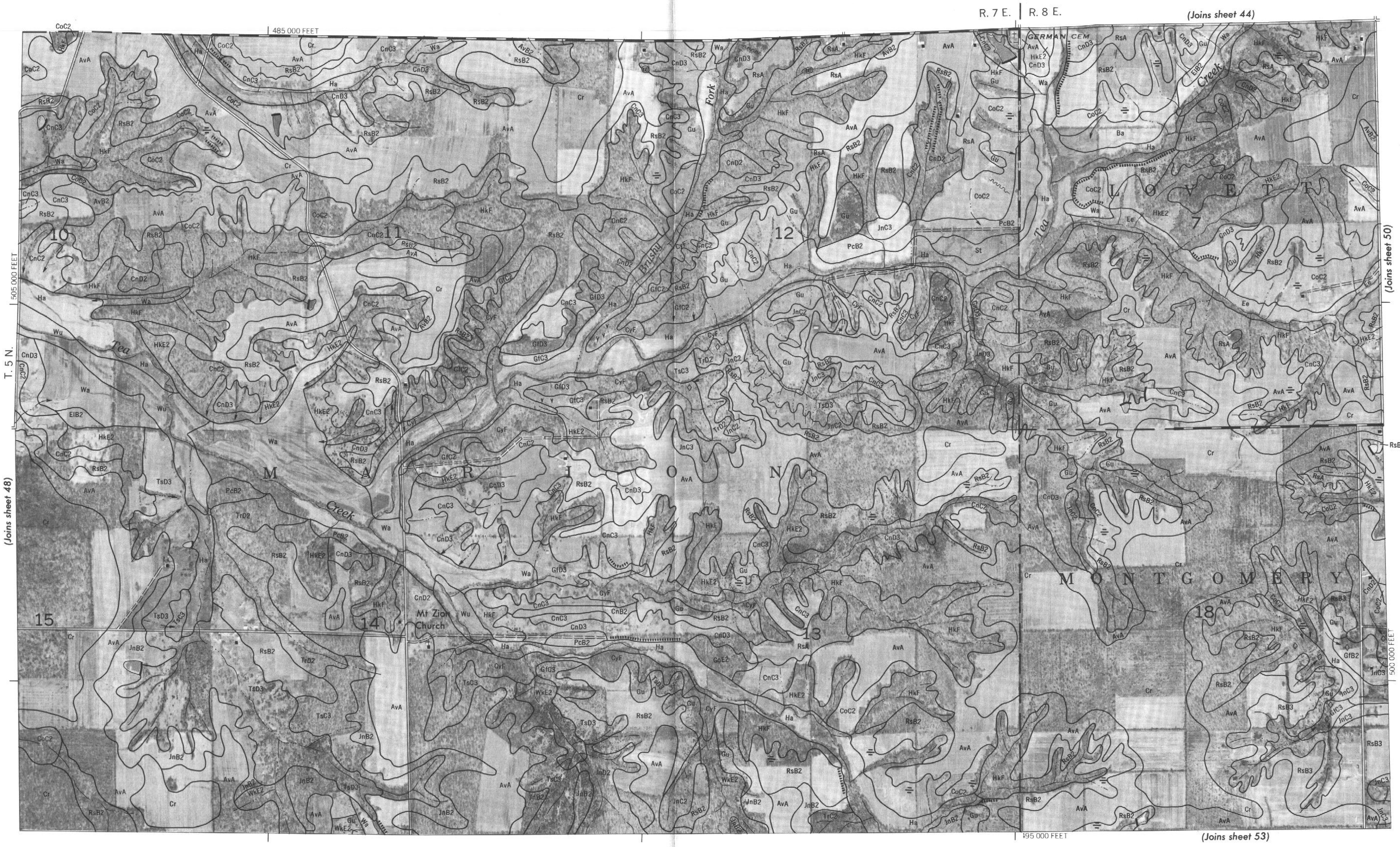
JENNINGS COUNTY, INDIANA — SHEET NUMBER 48

Land division corners are approximately positioned on this map.

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone.

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Purdue University Agricultural Experiment Station.

N



1 Mile
5000 Feet
0 ¼ ½ ¾ 1
0 1000 2000 3000 4000 5000

JENNINGS COUNTY, INDIANA NO. 49

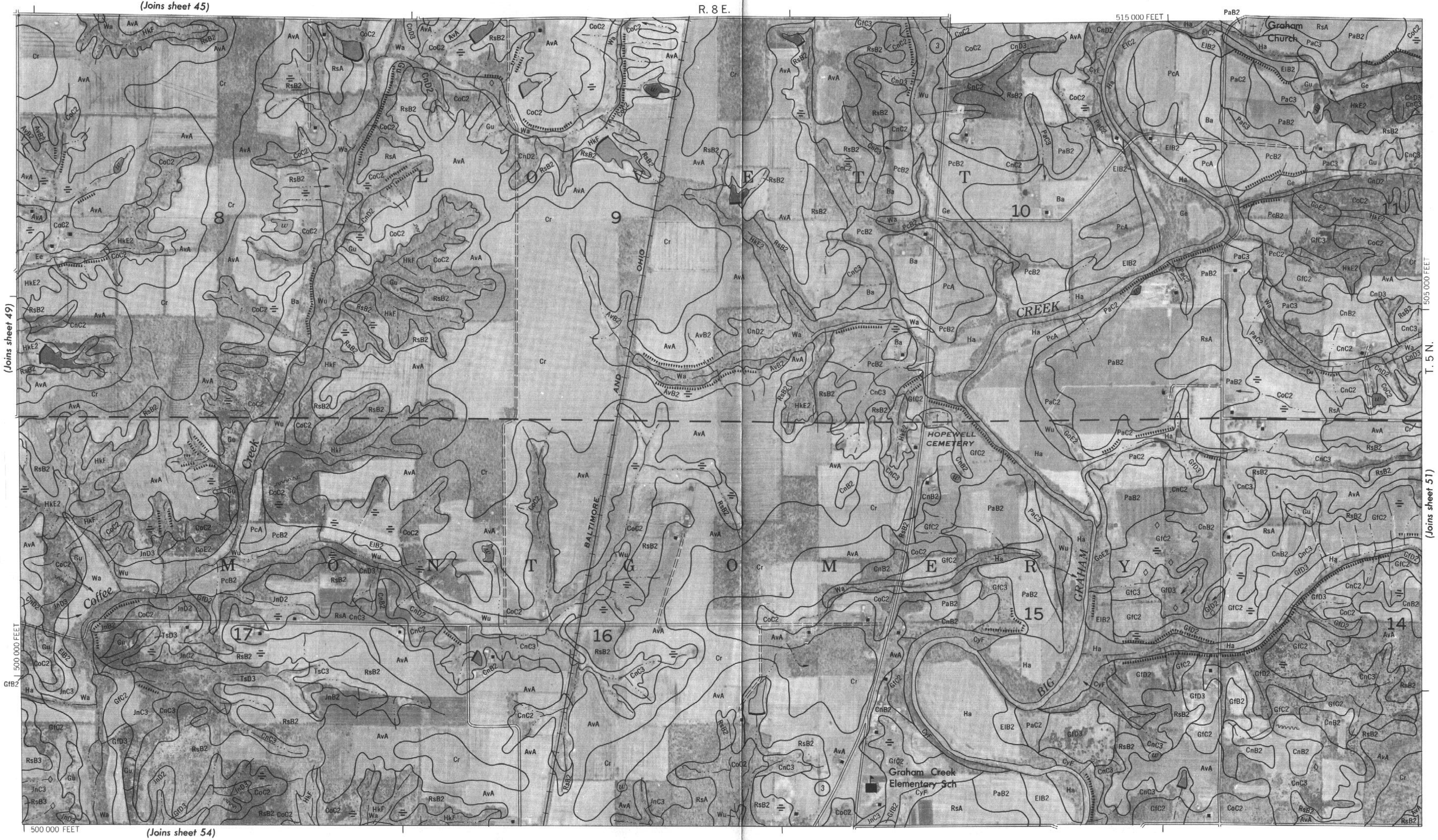
This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Purdue University Agricultural Experiment Station.

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone.

Land division corners are approximately positioned on this map.

N

1 Mile — 5000 Feet



Land division corners are approximately positioned on this map.

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone.

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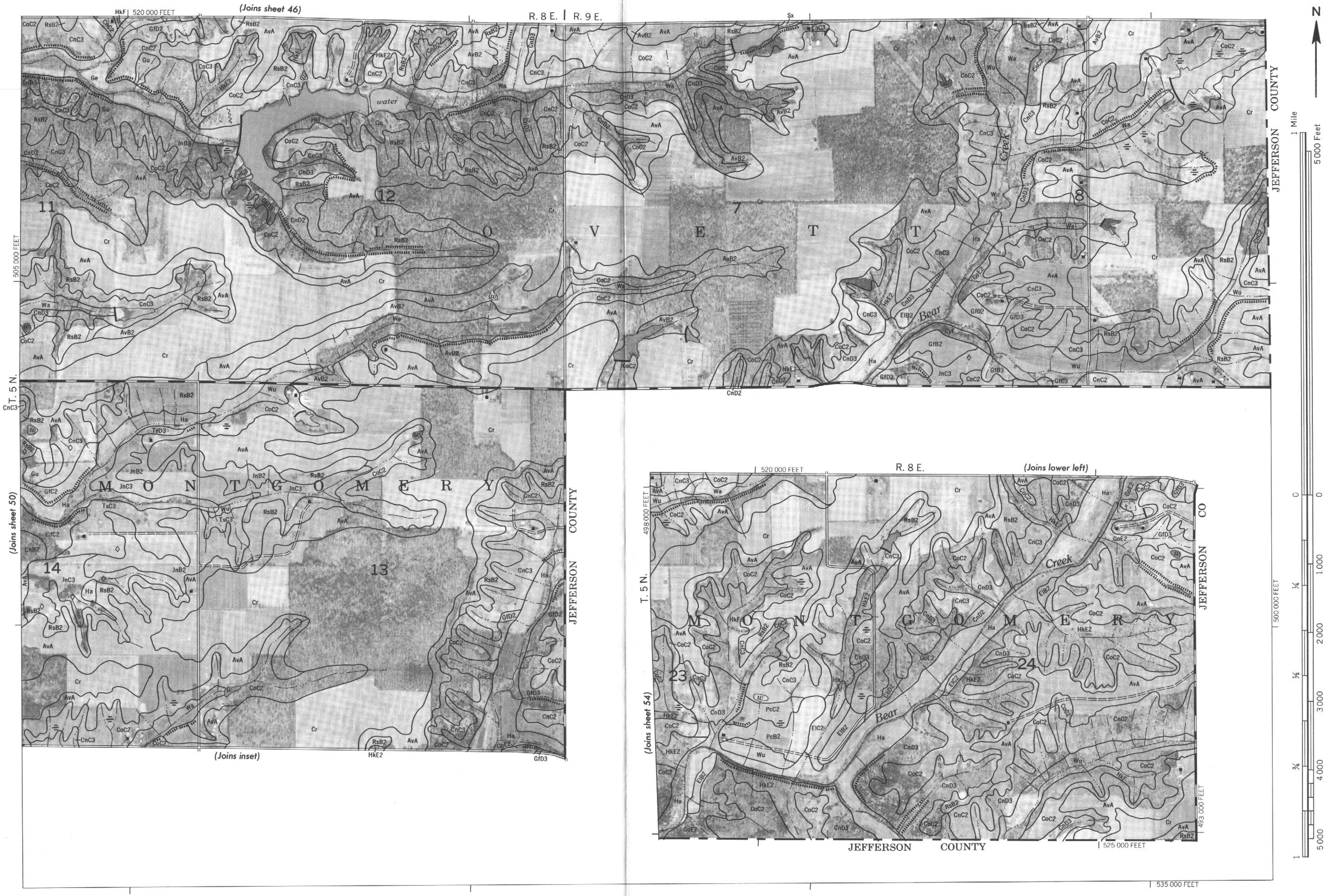

JENNINGS COUNTY, INDIANA NO. 51

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Purdue University Agricultural Experiment Station. Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone. Land division corners are approximately positioned on this map.

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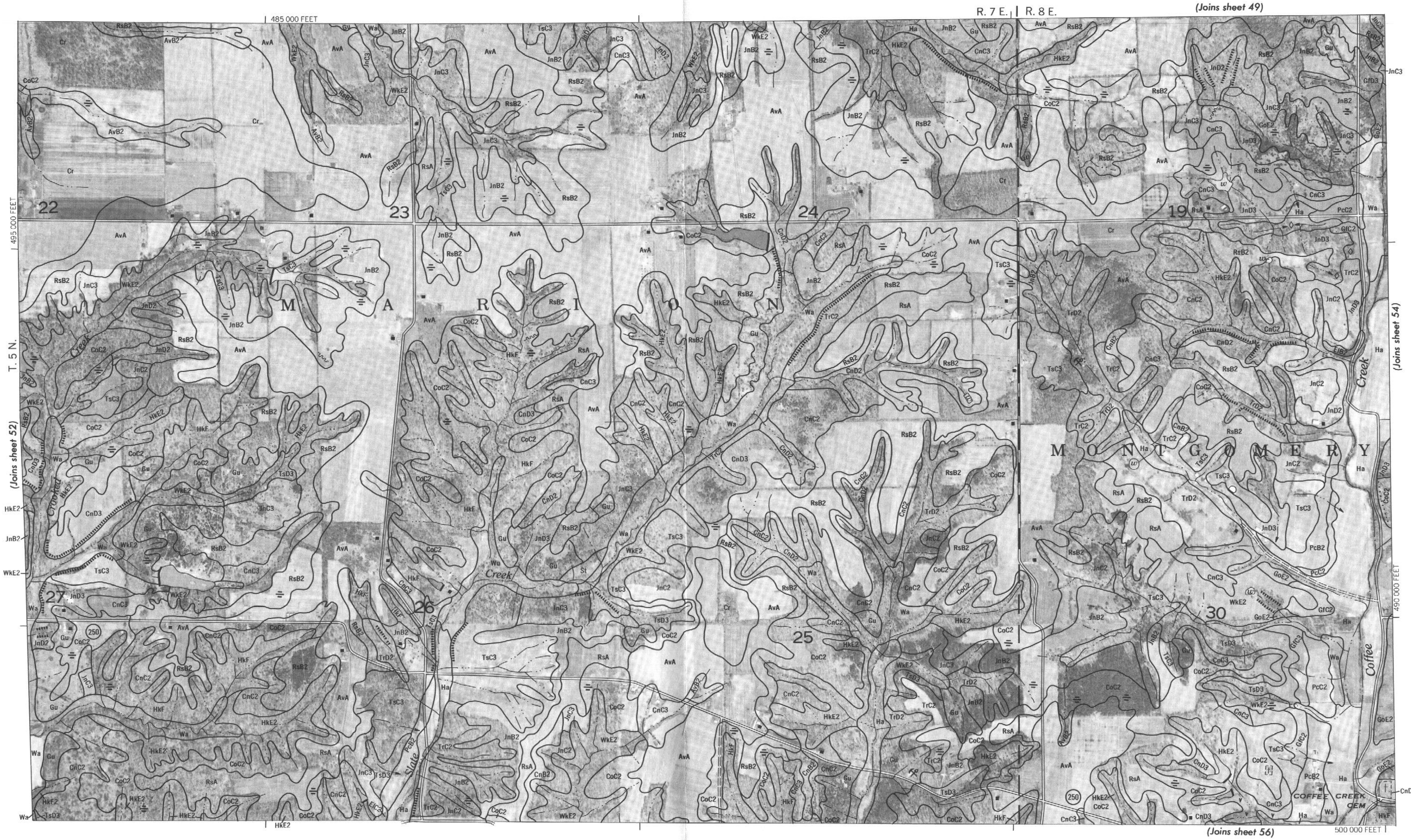
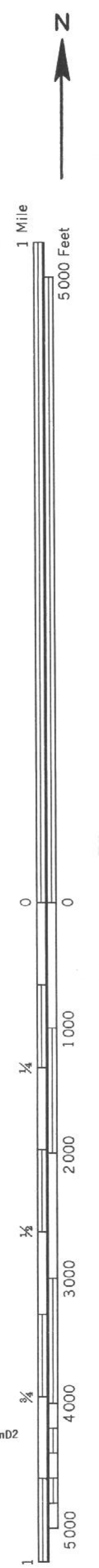
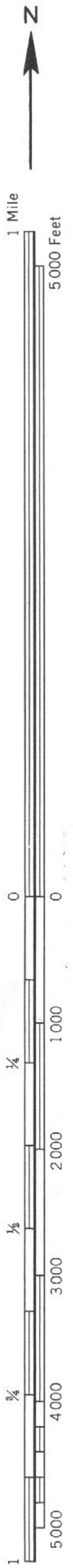
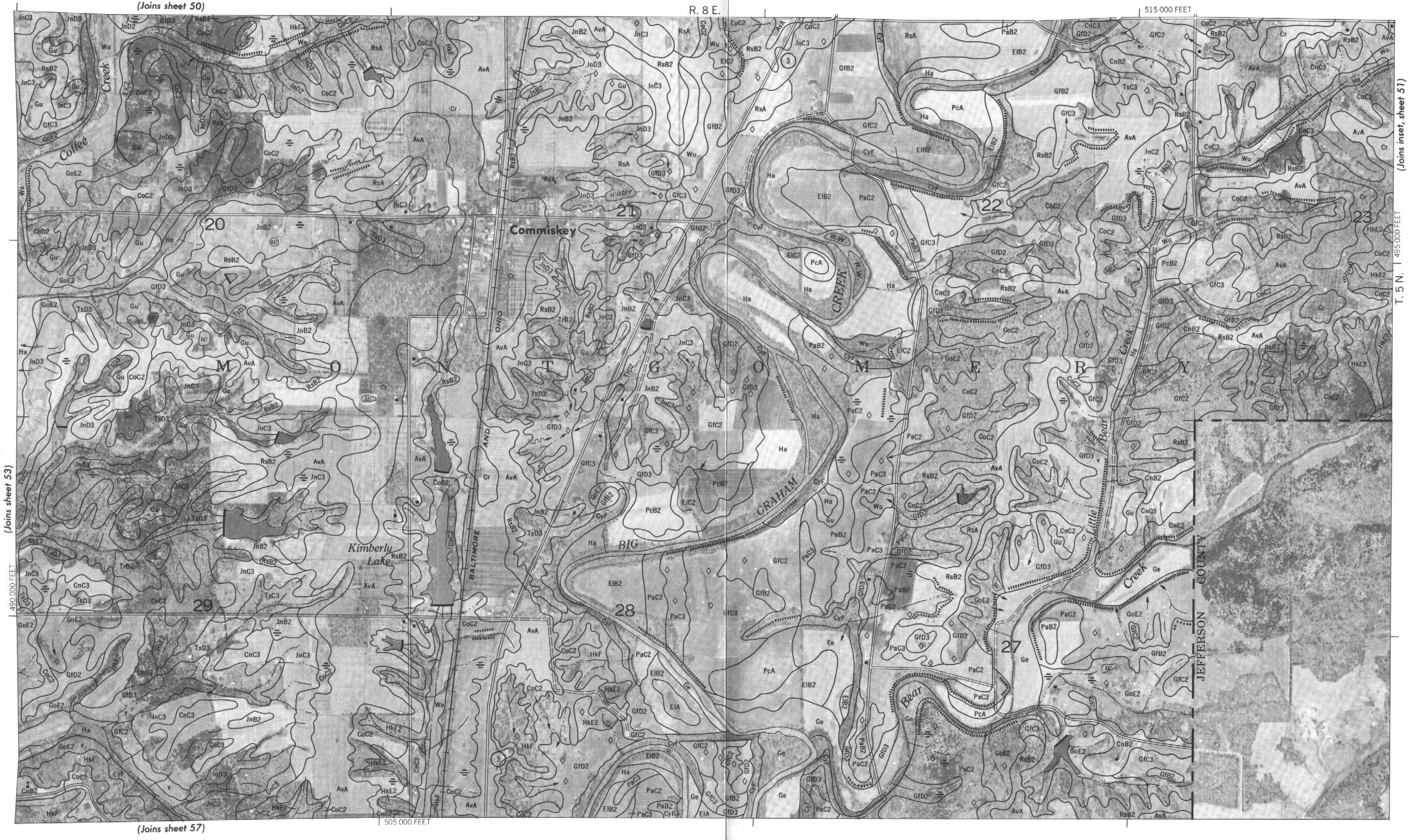
JENNINGS COUNTY, INDIANA NO 53

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Purdue University Agricultural Experiment Station.
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Indiana coordinate system, east zone.
Land division corners are approximately positioned on this map.









Land division corners are approximately positioned on this map.

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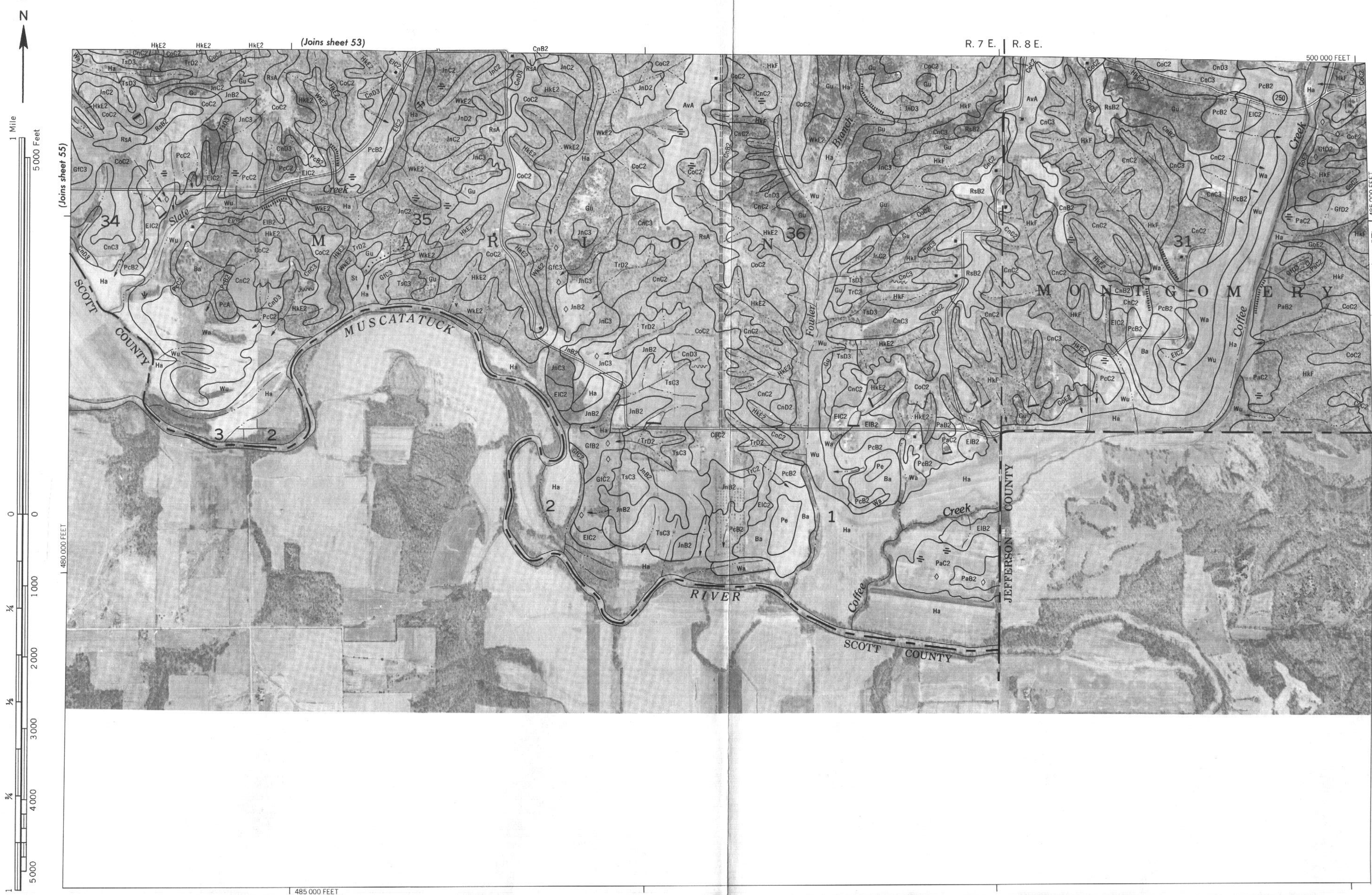

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